POWER SYSTEMS NETWORK MANAGEMENT

PROTECTION AND SUBSTATION AUTOMATION SYSTEMS

WBS NO: S-13656

CONTRACTOR : ABB Contracting Company

CLIENT : National GridSA

PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8

SUBSTATION : S/S 8709

CONTRACT NO. : 11131113/00

TITLE : Assembly Drawing - +R01.1 [GT-2]

AS-BUILT BY _____ DATE _____

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

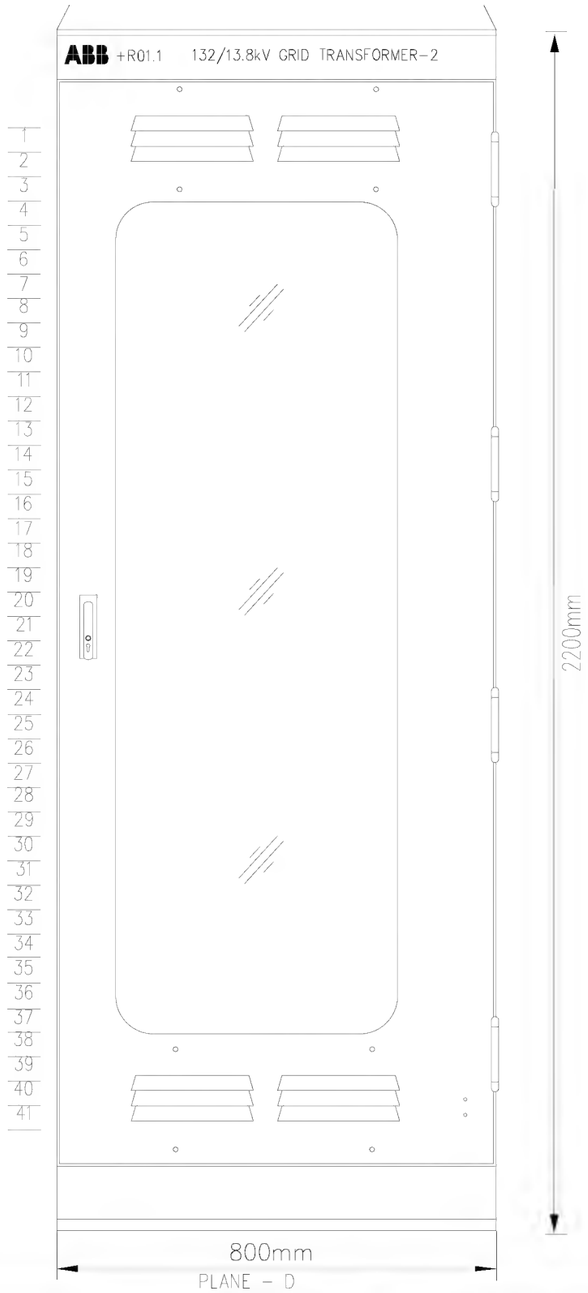
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

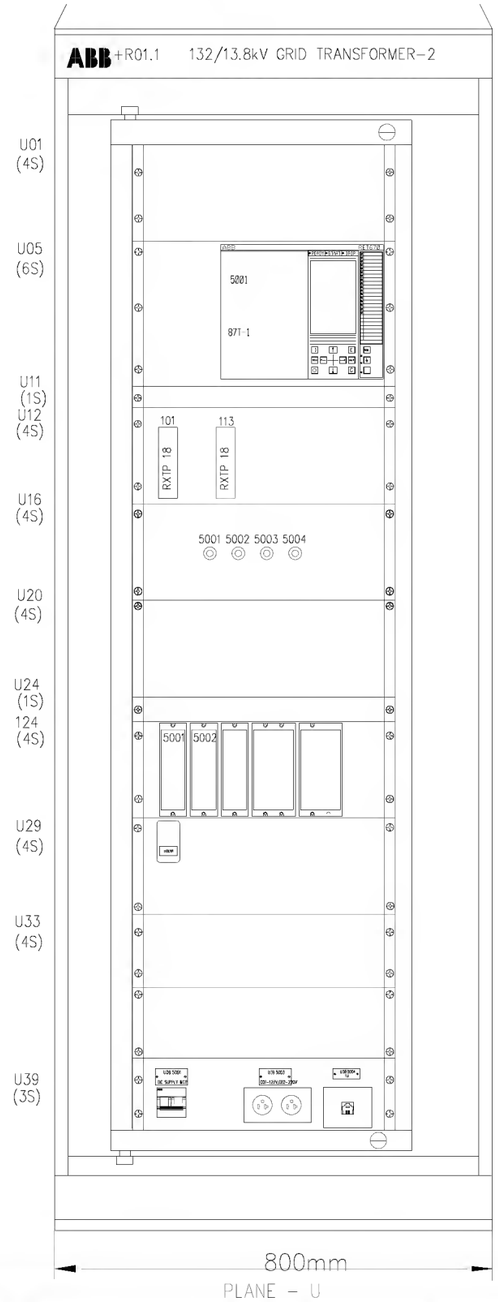
COVER SHEET

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA





MOUNTING PLANES	
EXTERIOR COLOUR	AIRCRAFT GREY COLOUR TO SHADE NO. RAL7038
INTERIOR COLOUR	SIGNAL WHITE COLOUR TO SHADE NO. RAL9003
CUBICLE TYPE	VSH 200
FRAME	HINGED FRAME, MOVABLE
CUBICLE TYPE	FRONT ACCESS
MATERIAL OF CONSTRUCTION	ALUZINK STEEL
DIMENSIONS	2200 X 800 X 800 mm (H X W X D)
CLASS OF PROTECTION	IP 41
APPROX WEIGHT	200KG
CABLE ENTRY	BOTTOM

AS-BUILT BY ____ DATE ____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED ____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

ASSEMBLY DRAWING
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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National Grid SA

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NG/D2-D (2012/01)
DMS VECTOR NGD200

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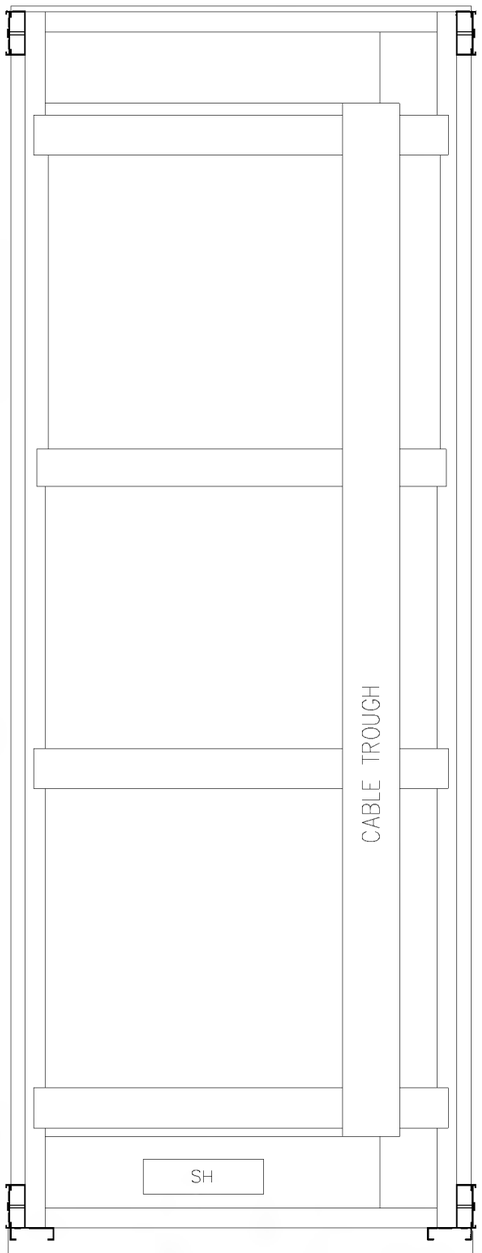
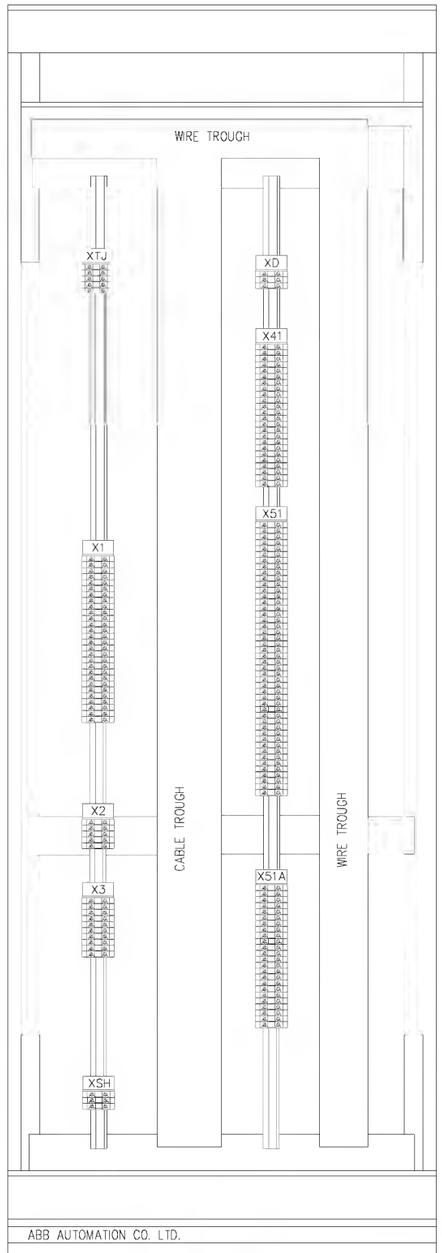
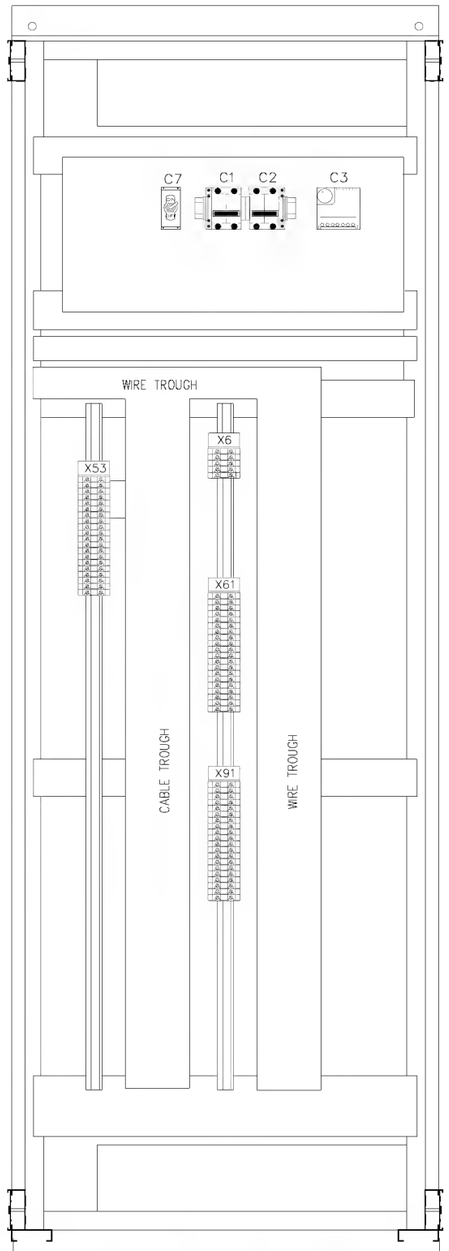


PLANE – A



PLANE – B



PLANE – C

PLANE – B

SCH.REF	DESCRIPTION	TYPE	MAKE
X1	CT CIRCUITS	OTTA 6T P/P	PHOENIX
X2	VT CIRCUITS	D6/8.ST1.RS	ENTRELEC
X3	AC INCOMING CIRCUITS	D6/8.ST1.RS	ENTRELEC
X41	DC EXT. CIRCUITS	M6/8.RS	ENTRELEC
X51,X51A	DC PROTN. CIRCUITS	M6/8.RS	ENTRELEC
XSH	SPACE HEATER	M6/8.RS	ENTRELEC
XD	DC INCOMING CIRCUITS	IN540B	MEJDAF

PLANE – C

SCH.REF	DESCRIPTION	TYPE	MAKE
XTJ	TELEPHONE JACK	M6/8.RS	ENTRELEC
X6	ALARM SUPPLY	M6/8.RS	ENTRELEC
X61	ALARM CIRCUITS	M6/8.RS	ENTRELEC
X91	SPARE CIRCUITS	M6/8.RS	ENTRELEC
X53	DC PROTN. CIRCUITS	M6/8.RS	ENTRELEC

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

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ASSEMBLY DRAWING
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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NG/D2-D (2012/01)
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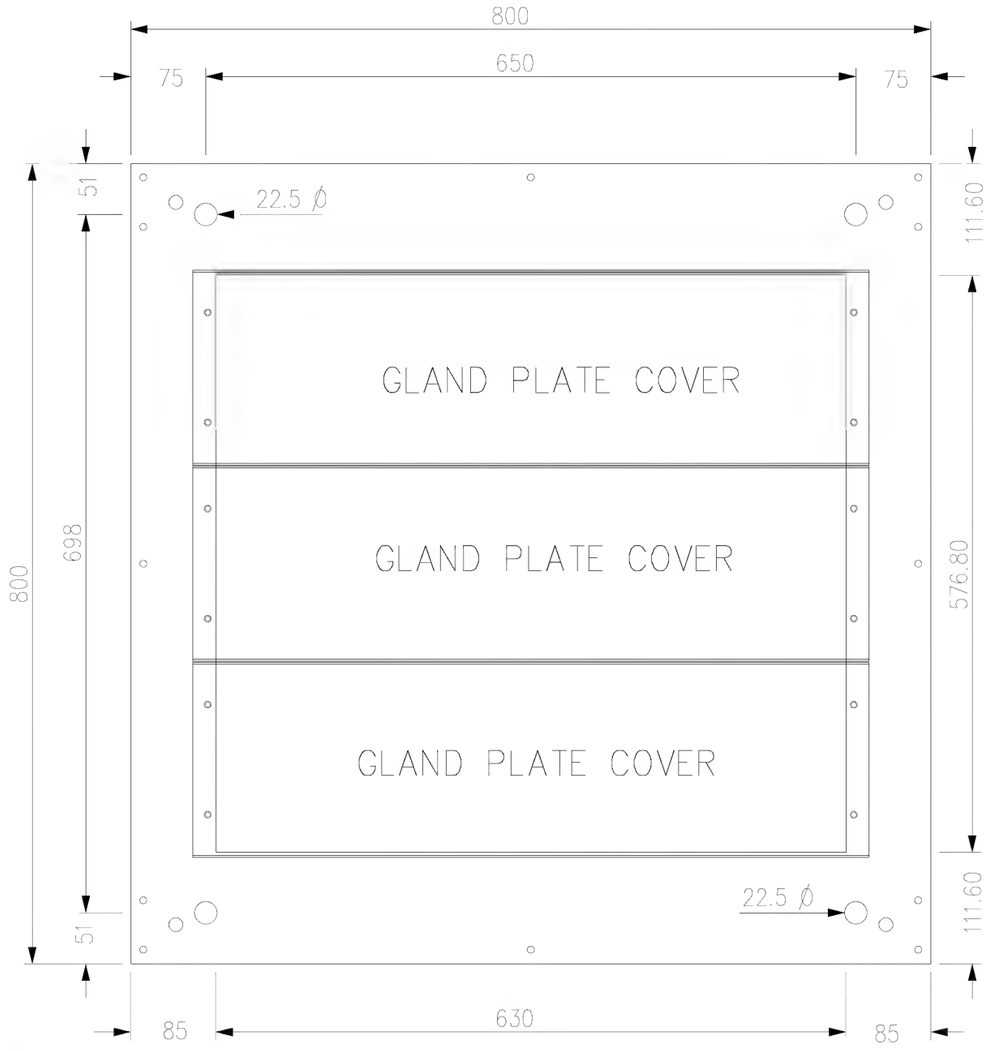
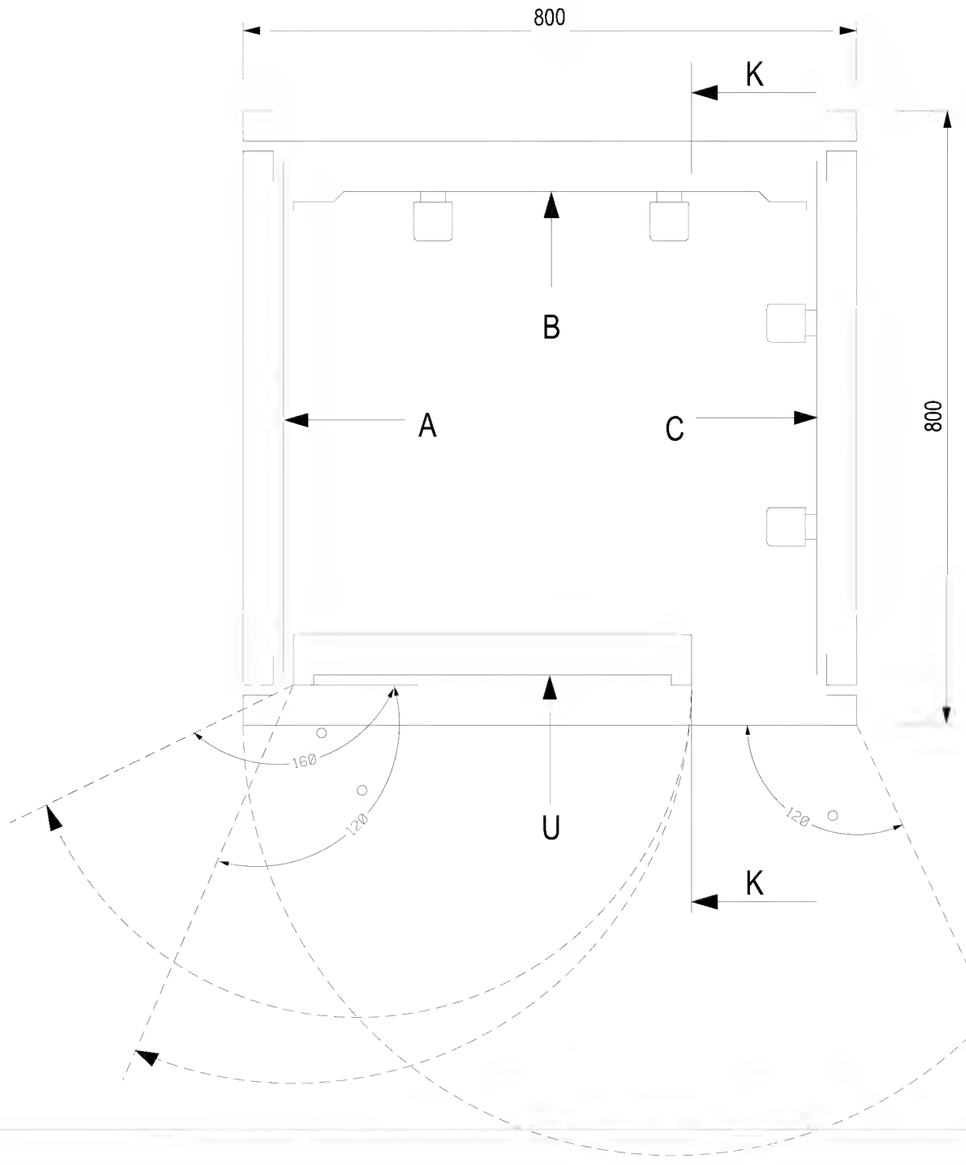
BASE PLATE/ FOUNDATION



PLAN



AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
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OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

ASSEMBLY DRAWING
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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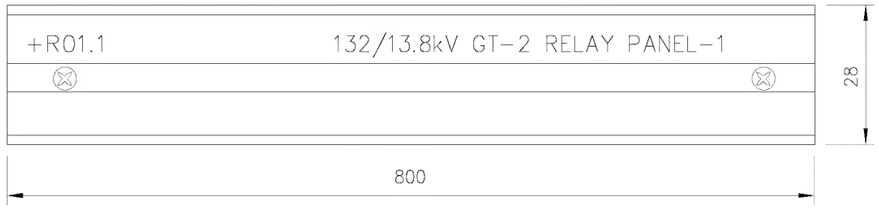
TOP VIEW FOR EARTHING BAR

U PLANE TOP LABEL



MANUFACTURING LABEL

ABB Automation Co.Ltd.

PROJECT	:	National Grid SA S/S 8709
ORDER REFERENCE	:	2875 RF S13656
YEAR OF MANUFACTURE	:	2013
PANEL NO.	:	+R01.1
DRAWING NO.	:	S13656-CD-323931

MADE IN THE KINGDOM OF SAUDI ARABIA

U PLANE BOTTOM LABEL

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

ASSEMBLY DRAWING

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

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POWER SYSTEMS NETWORK MANAGEMENT
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.,
414, AL-KHARJ ROAD
SECOND INDUSTRIAL CITY
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company

CLIENT : National GridSA

PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY

SUBSTATION : S/S 8709

CONTRACT NO. : 11131113/00

TITLE : LIST OF APPARATUS +R01.1 [GT-2]

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AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

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OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

COVER SHEET
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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NG/D2-D (2012/01)
DMS VECTOR NGD200

SR. NO.	GA REF.	SCH. REF.	D E S C R I P T I O N	SHEET NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
			RELAY CUBICLE- +R01.1 ACCOMODATING THE FOLLOWING					
1	U05.5001	87T-1	NUMERICAL TRANSFORMER PROTECTION IED WITH FOLLOWING DETAILS	301	1	RET 670*1	ABB	1MRK 004 816-DC
			FUNCTIONS					
			-CONFIGURATION ALTERNATIVE		1			1MRK 004 005-DC
			DOUBLE BREAKER, 3WINDING (B40) BASIC					
			-CONTROL					
			HARDWARE					
			-ANALOG SYSTEM					
			TRANSFORMER INPUT MODULE,RING LUG TERMINALS 91+3U,1A					
			110/220/V,50/60HZ/(TRM)(BASIC SELECTED ALTERNATIVE)LOCATION/P40/					
			TRANSFORMER INPUT MODULE,RING LUG TERMINALS 91+3U,1A					
			110/220/V,50/60HZ/(TRM)(BASIC SELECTED ALTERNATIVE)LOCATION/P41/					
			-CASING					
			POWER SUPPLY MODULE 90-250 VDC (PSM)					
			LOCATION P1/					
			NUMERIC PROCESSING MODULE 600MHZ, 256MB (NUM) BASIC					
			LOCATION/P30/					
			3/4\SX 19" RACK CASING MAX 5 I/O MOD,					
			2TRM (RACK)					
			COMBINED BACKPLANE MODULE MAX 5 I/O MOD.					
			(BASIC SELECTED ALTERNATIVE) 2TRM (RACK)					
			UNIVERSAL BACKPLANE MODULE 2 ADM,2TRM (UBM) BASIC					
			-CONNECTION TYPE					
			STANDARD COMPRESSION CONNECTION TERMINALS)					
			LOCATION/P1-P16					
			-HUMAN MACHINE INTERFACE					
			MEDIUM GRAPHIC HMI,15 CONTROLLABLE OBJECTS					
			3/4 X 19"IEC (MHMI)					
			-IN/OUT MODULES					
			BINARY INPUT MODULE LOCATION P3,P5		2			1MRK 000 508-BB
			BINARY OUTPUT MODULE,24 OUTPUT RELAYS (BOM)		2			1MRK 000 614-AB
			LOCATION P4					
			OPTICAL ETHERNET MODULE 2 GLASS INTERFACE IEC61850-8-1/IEC61850-9-2					1MRK 002 266-AA
			(OEM)(SELECTED OPTION) LOCATION P31:1					
2	U12.101	TS-1	TEST SWITCH FOR RET670 RELAY	222	1	RTXP18	ABB	RK 926 115-BH
	U12.113	TS-2	TEST SWITCH FOR RET670 RELAY	222	1	RTXP18	ABB	RK 926 115-BB

AS-BUILT BY _____ DATE _____

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DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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NG/D2-D (2012/01)

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SR. NO.	GA REF.	SCH. REF.	D E S C R I P T I O N	SHEET NO.	QTY.	TYPE	MAKE	ORDERINC INFORMATION
3	U16.5001	S86T1	PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS	232	1	MP1-10B	ABB	1SFA 611 100 R1006
			FOR RESET OF LOCKOUT RELAY (86T1)			MCBH-20		1SFA 611 605 R1102
4	U16.5002	S86CBF	PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS	276	1	MP1-10B	ABB	1SFA 611 100 R1006
			FOR RESET OF LOCKOUT RELAY (86CBF)			MCBH-20		1SFA 611 605 R1102
5	U16.5003	S86B-1	PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS	276	1	MP1-10B	ABB	1SFA 611 100 R1006
			FOR RESET OF LOCKOUT RELAY (86B-1)			MCBH-20		1SFA 611 605 R1102
6	U16.5004	S86B-2	PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS	277	1	MP1-10B	ABB	1SFA 611 100 R1006
			FOR RESET OF LOCKOUT RELAY (86B-2)			MCBH-20		1SFA 611 605 R1102

AS-BUILT BY _____ DATE _____

REV. NO.	DATE	DESCRIPTION
Ø1	13 49	FACTORY ASBUILT
ØØ	13 Ø4	FOR APPROVAL

CONTRACT NO. 11131113/ØØ

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.Ø1.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-1 +RØ1.1

S/S 8ØØ9-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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NG/D2-D (2012/Ø1)

DMS VECTOR NGD2ØØ

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SR. NO.	GA REF.	SGH. REF.	D E S C R I P T I O N	SHEET NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
7	U25.5001	86T1	TRIP UNIT COMPRISING OF:	232,276	2	MVAJ105	ALSTOM	MVAJ105 RA0804A
	U25.5003	86CBF	TRIPPING RELAY : HIGH BURDEN TYPE					
			AUX.VOLTAGE : 110–125V DC					
			CONTACTS : 6NO + 4NC ELECTRICAL AND HAND RESET					
			FLAGING : HAND RESET					
			CONTACT MECHANISM : HAND & ELECTRICALLY RESET					
8	U25.5002	94T1	TRIP UNIT (94T1) COMPRISING OF:	232	1	MVAJ101	ALSTOM	MVAJ101RA0800A
			AUX. VOLTAGE : 110/125V DC					
			CONTACT DATA : 10 NO, SELF RESET					
			FLAGING : HAND RESET					
9	U25.5004	86B–1	TRIP UNIT COMPRISING OF:	276,277	2	MVAJ205	ALSTOM	MVAJ205TA0804A
	U25.5005	86B–2	TRIPPING RELAY : HIGH BURDEN TYPE					
			AUX.VOLTAGE : 110–125V DC					
			CONTACTS : 16NO + 4NC ELECTRICAL AND HAND RESET					
			FLAGING : HAND RESET					
			CONTACT MECHANISM : HAND & ELECTRICALLY RESET					
10	U29.101	74R1/74RS	DUAL TARGET RELAY (REVERSE FLAG) "€R1 DC SUPPLY FAIL	232	1	RXSF 1	ABB	RK 271 019–AN
			AUXILIARY VOLTAGE : 110–125V DC					
			CONTACT DATA : 1NO + 2NC PER COIL					
			FLAG : SELF RESET					
11	U29.107	TMR/86B–1	DELAY FOR PICKUP RELAY	276/277	2	RXKL 1	ABB	1MRK 000 066–AB
	U29.301	TMR/86B–2	AUXILIARY VOLTAGE : 24–250V DC					
			CONTACT DATA : 2 C/O					
12	U29.307	R1	RESISTOR UNIT FOR TCS	291	1	RXTMA1	ABB	RK 711 008–AF
			RESISTOR WATT : 6.8K OHMS					

REV. NO.	DATE	DESCRIPTION
Ø1	13 49	FACTORY ASBUILT
ØØ	13 Ø4	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/ØØ

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.Ø1.2Ø13 DATE COMPLETED _____

OPRG. DEPT. CTPC ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-1 +RØ1.1

S/S 8ØØ9-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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نقل الكهرباء National Grid SA

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NG/D2-D (2Ø12/Ø1)

DMS VECTOR NGD2ØØ

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SR. NO.	GA REF.	SGH. REF.	D E S C R I P T I O N	SHEET NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
13			MCB 2 POLE 6A, FOR DC SUPPLY	216	3	S282 UC K6	ABB	GHS S282 064 R0317
			WITH 2NC AUXILIARY CONTACT			S2-H02		GH S270 1916 R0003
	U39.5001	Q1	R1€ SUPPLY					
	U39.5002	Q2	RS€ SUPPLY					
	U36.5001	Q3	TC1€ SUPPLY					
14	U39.5003	C01	CONVENIENCE OUTLET 10A, 127V AC	211	2	USM45&USMS45	LEGRAND	74140 & 74180
		C02	CONVENIENCE OUTLET 10A, 220V AC					
15		C1,C2	MINIATURE CIRCUIT BREAKER, 2 POLE, 10A FOR	211	2	S202P-K10	ABB	2CDS 252 001 R0427
			CONVENIENCE OUTLET WITH AUXILIARY SWITCH, 1NO + 1NC CONTACTS			S2C-H11L		GH 270 1917 R001
16		C3	THERMOSTAT FOR SPACE HEATER, 5-60?C	211	1	SK 3110	RITTAL	SK 3110
17	U39.5004	TJ	TELEPHONE JACK 1GANG 4WIRE	211	1	EDF410	EDISON	EDF410
18		C7	ON/OFF SWITCH FOR SPACE HEATER	211	1	M2SS1-10B	ABB	1SFA 611 200 R1006
						MCBH-10		1SFA 611 605 R1101
19		DS	DOOR SWITCH FOR CONTROL OF CUBICLE INTERNAL ILLUMINATION LAMP	211	1	LS30P	ABB	1SBV 010 213 R1202
20		IL	INTERNAL ILLUMINATION CUBICLE LAMP SUITABLE FOR	211	1	T4	SUNON	SP-20W
			127V AC, 60Hz SUPPLY					
21		SH	SPACE HEATER, 150W, 120V, 60Hz	211		RICA	GRUPPO	1FZEK006C001

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

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DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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NG/D2-D (2012/01)

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SR. NO.	GA REF.	SGH. REF.	D E S C R I P T I O N	SHEET. NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
22		X1	BLOT CONNECTING TERMINAL BLOCKS DISCONNECTIBLE FOR CT CIRCUITS	304	60	OTTA 6T P/P	PHOENIX	0790462
		X2	SPRING LOADED TERMINAL BLOCKS DISCONNECTIBLE FOR VT CIRCUITS	304	5	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
		X3	SPRING LOADED TERMINAL BLOCKS DISCONNECTIBLE FOR AC CIRCUITS	304	10	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
		X41	SPRING LOADED TERMINAL BLOCK FOR DC EXT. CIRCUITS	304	40	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
		X51	SPRING LOADED TERMINAL BLOCK FOR DC PROTN. CIRCUITS	304	97	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		X6	SPRING LOADED TERMINAL BLOCK FOR STN COM	304	10	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		X61	KNIFE TYPE TERMINAL BLOCKS DISCONNECTIBLE FOR STN.-COM ALARM CIRCUITS	304	20	M6/8.SNB	ENTRELEC	1SNA 115 688 R2500
		XTJ	SPRING LOADED TERMINAL BLOCK KNIFE TYPE FOR TELEPHONE JACK	305	5	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		XSH	SPRING LOADED TERMINAL BLOCKS FOR SPACE HEATER	305	3	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		XD	TERMINAL BLOCKS WITH BLOCKING DIODE, Vrrm=1kV, If=3A	236,276	3	N4/6.S	ENTRELEC	11521310
			AND SURGE TRAP, ENERGY ABSORPTION RATING 8J (10/1000mS)			IN5408	MEJDAF	02-049
						V150ZA1	RS	239-270
		X9	SPRING LOADED TERMINAL BLOCK KNIFE TYPE FOR SPARE CONTACTS	295	20	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		X51A	SPRING LOADED TERMINAL BLOCK FOR DC PROTN. CIRCUITS	304	15	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		X53	SPRING LOADED TERMINAL BLOCK FOR DC PROTN. CIRCUITS	304	32	M6/8.RS	ENTRELEC	1SNA 115 685 R1200

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322929	L05	L06	01

NG/D2-D (2012/01)

DMS VECTOR NGD200

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LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
U05.5001	U05.5001 87T1	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U12.101	U12.101 TS-1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U12.113	U12.113 TS-2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U16.5001	U16.5001 S86T1	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U16.5002	U16.5002 S86CBF	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U16.5003	U16.5003 S86B-1	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U16.5004	U16.5004 S86B-2	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U25.5001	U25.5001 86T1	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U25.5002	U25.5002 94T1	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U25.5003	U25.5003 86CBF	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U25.5004	U25.5004 86B-1	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U25.5005	U25.5005 86B-2	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U29.101	U29.101 74R1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U29.107	U29.107 TMR/86B-1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U29.301	U29.301 TMR/86B-2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U29.307	U29.307 R2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U29.113	U29.113 R1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U39.5001	U39.5001 Q1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U39.5002	U39.5002 Q2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U36.5001	U36.5001 Q3	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm

REV. NO.	DATE	DESCRIPTION
Ø1	13 49	FACTORY ASBUILT
ØØ	13 Ø4	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/ØØ

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.Ø1.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-1 +RØ1.1

S/S 8ØØ9-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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National Grid SA

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-	C421	CD-322929	LØ6	LØ7	Ø1

NG/D2-D (2012/Ø1)

DMS VECTOR NGD2ØØ

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LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
C1	C1 127V AC SUPPLY MCB	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C2	C2 220V AC SUPPLY MCB	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C3	C3 THERMOSTAT	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C7	C7 ON/OFF SWITCH	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
DS	DS DOOR SWITCH	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
IL	IL ILLUMINATION LAMP	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
SH	SH SPACE HEATER	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm

AS-BUILT BY _____ DATE _____

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء

National Grid SA

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-	C421	CD-322929	L07	G00	01

NG/D2-D (2012/01)

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POWER SYSTEMS NETWORK MANAGEMENT
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.,
414, AL-KHARJ ROAD
SECOND INDUSTRIAL CITY
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company

CLIENT : National GridSA

PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY

SUBSTATION : S/S 8709

CONTRACT NO. : 11131113/00

TITLE : Assembly Drawing +R01.2 [GT-2]

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

COVER SHEET
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322930	G00	G01	01

NG/D2-D (2012/01)
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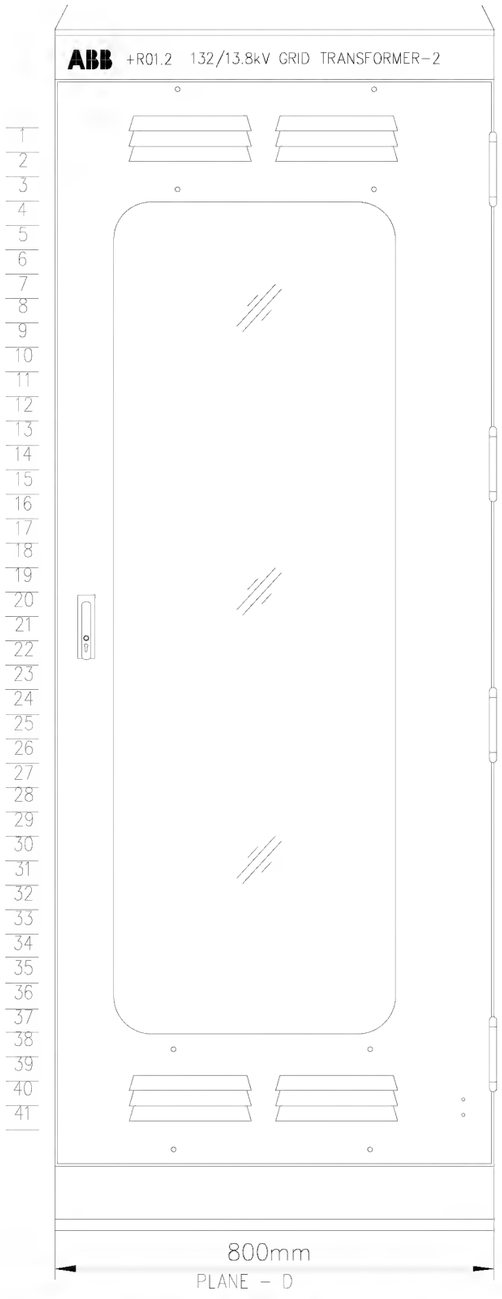

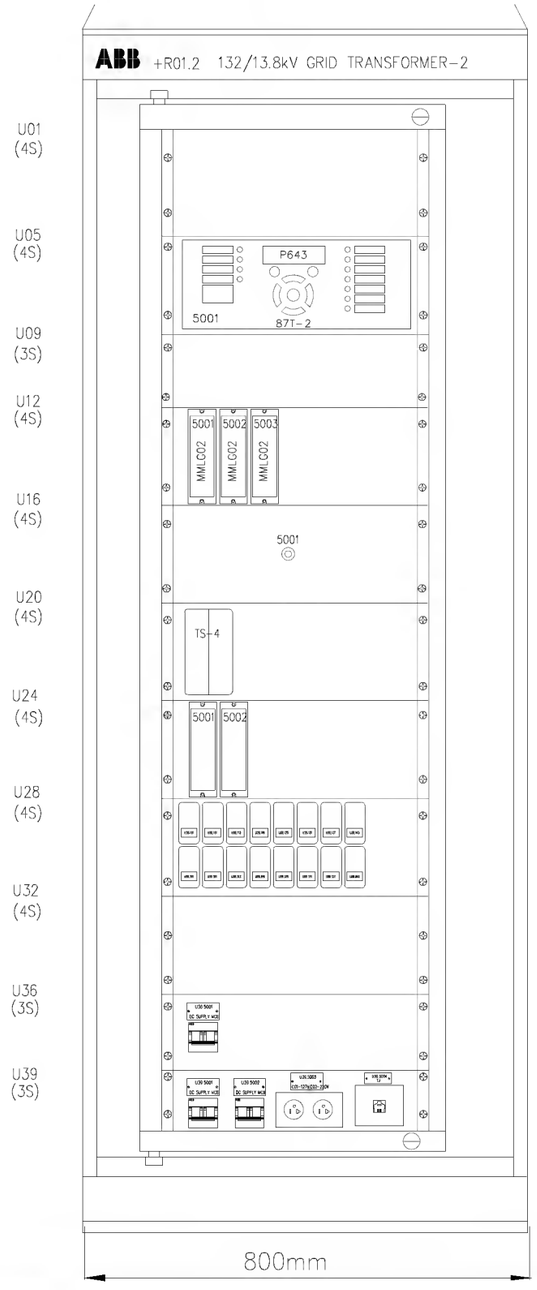

MOUNTING PLANES	
EXTERIOR COLOUR	AIRCRAFT GREY COLOUR TO SHADE NO. RAL7038
INTERIOR COLOUR	SIGNAL WHITE COLOUR TO SHADE NO. RAL9003
CUBICLE TYPE	VSH 200
FRAME	HINGED FRAME, MOVABLE
CUBICLE TYPE	FRONT ACCESS
MATERIAL OF CONSTRUCTION	ALUZINK STEEL
DIMENSIONS	2200 X 800 X 800 mm (H X W X D)
CLASS OF PROTECTION	IP 41
APPROX WEIGHT	200KG
CABLE ENTRY	BOTTOM

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

ASSEMBLY DRAWING
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322930	G01	G02	01

NG/D2-D (2012/01)
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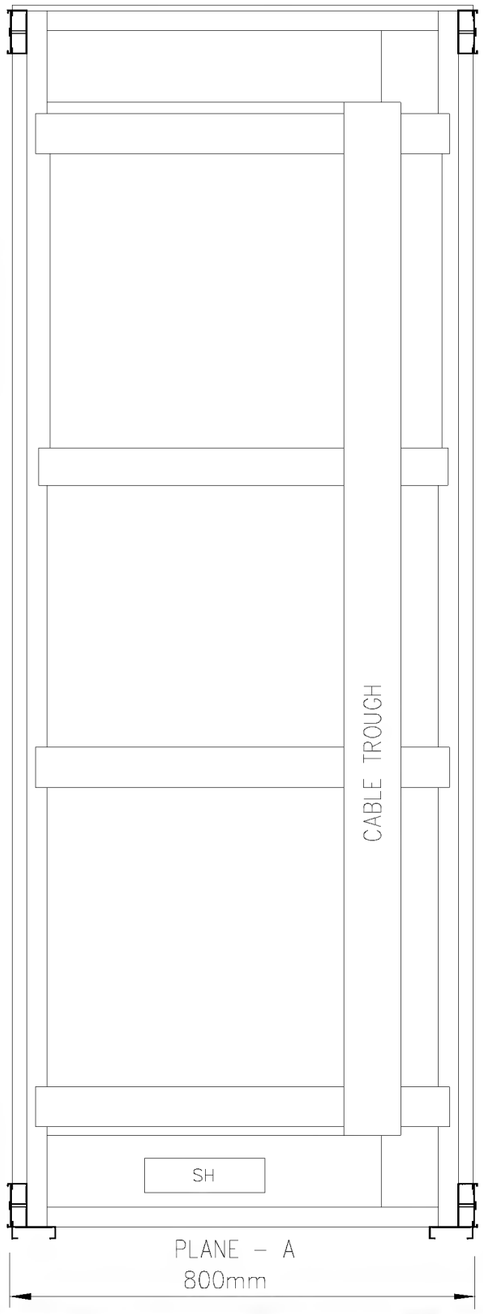

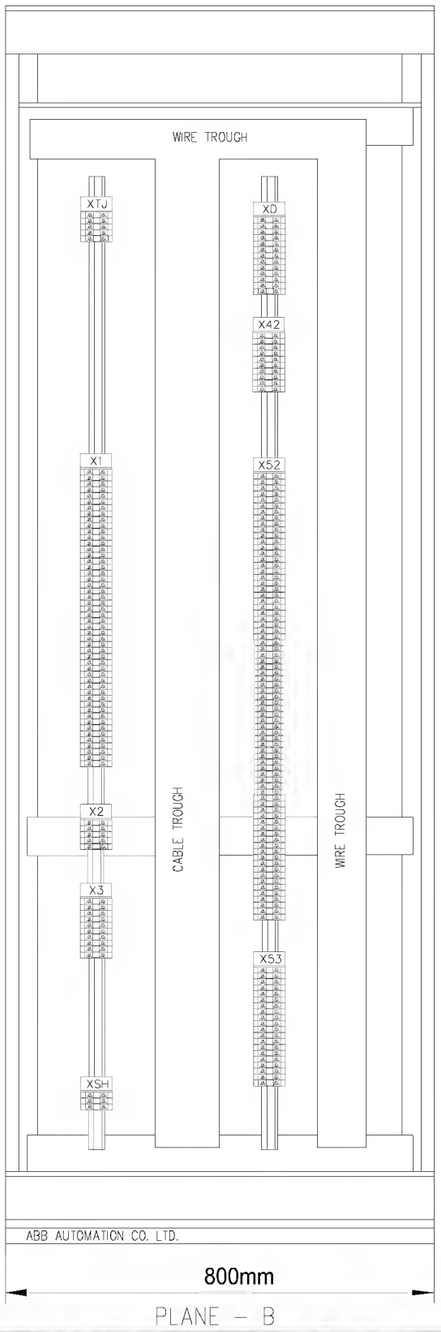

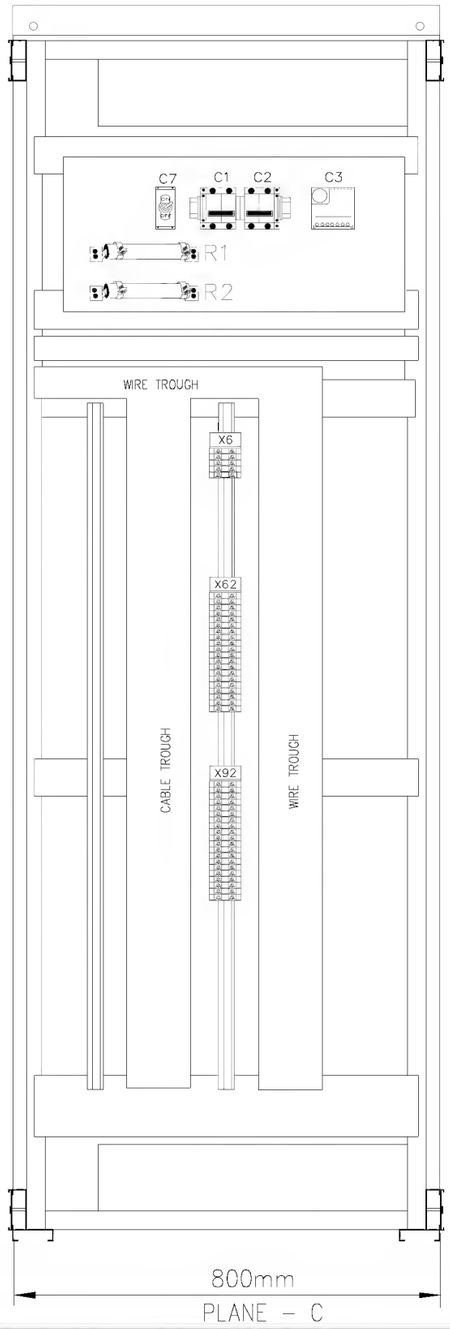

PLANE – B

SCH REF	DESCRIPTION	TYPE	MAKE
X1	CT CIRCUITS	OTTA 6T P/P	PHOENIX
X2	VT CIRCUITS	D6/8.ST1.RS	ENTRELEC
X3	AC INCOMING CIRCUITS	D6/8.ST1.RS	ENTRELEC
X42	DC EXT. CIRCUITS	M6/8.RS	ENTRELEC
X52,X53	DC PROTN. CIRCUITS	M6/8.RS	ENTRELEC
XD	DC INCOMING CIRCUITS	IN540B	MEJDAF
XSH	SPACE HEATER	M6/8.RS	ENTRELEC

PLANE – C

SCH.REF	DESCRIPTION	TYPE	MAKE
XTJ	TELEPHONE JACK	M6/8.RS	ENTRELEC
X6	ALARM SUPPLY	M6/8.RS	ENTRELEC
X62	ALARM CIRCUITS	M6/8.RS	ENTRELEC
X92	SPARE CIRCUITS	M6/8 RS	ENTRELEC

REV. NO.	DATE	DESCRIPTION
Ø1	13 49	FACTORY ASBUILT
ØØ	13 Ø4	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/ØØ

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.Ø1.2Ø13 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

ASSEMBLY DRAWING

132/13.8kV GT-2 RELAY PANEL-2 +RØ1.2

S/S 8ØØ-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322930	GØ2	GØ3	Ø1

NG/D2-D (2012/01)

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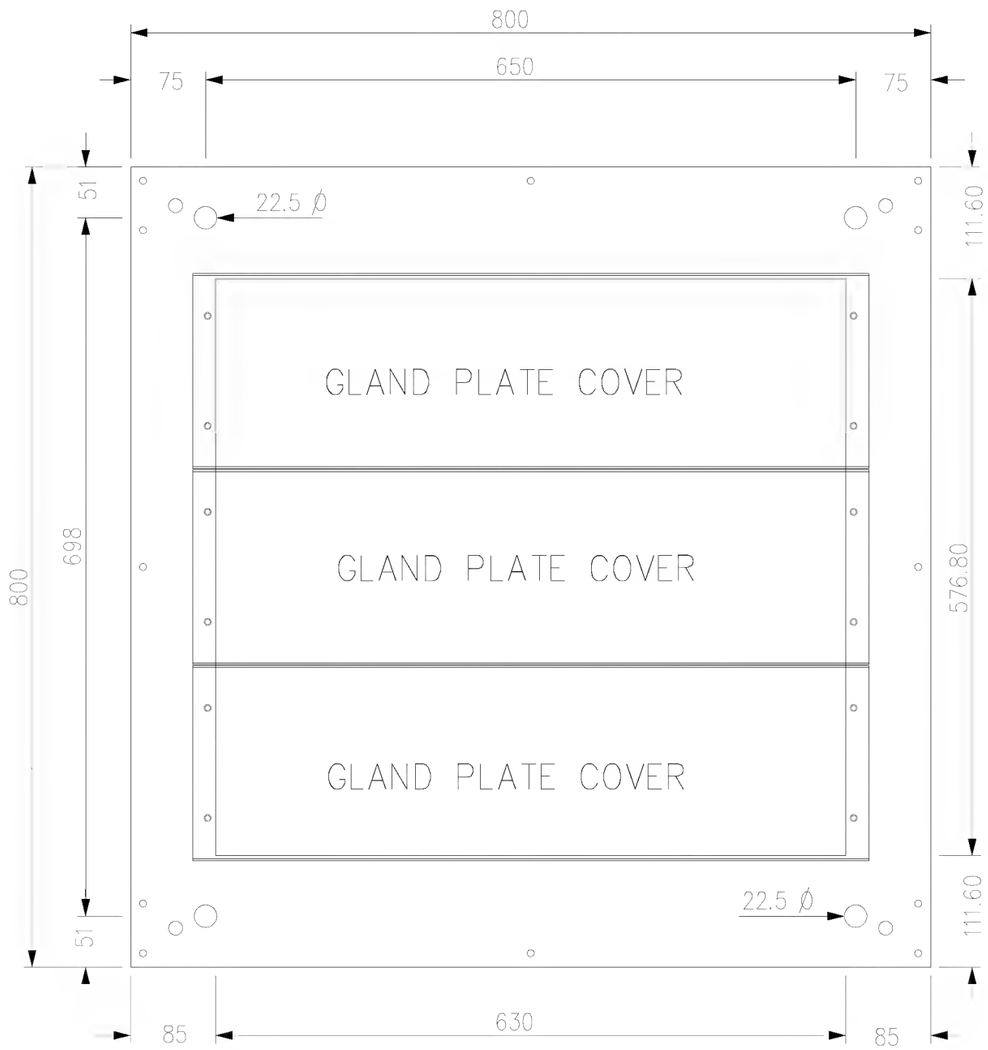
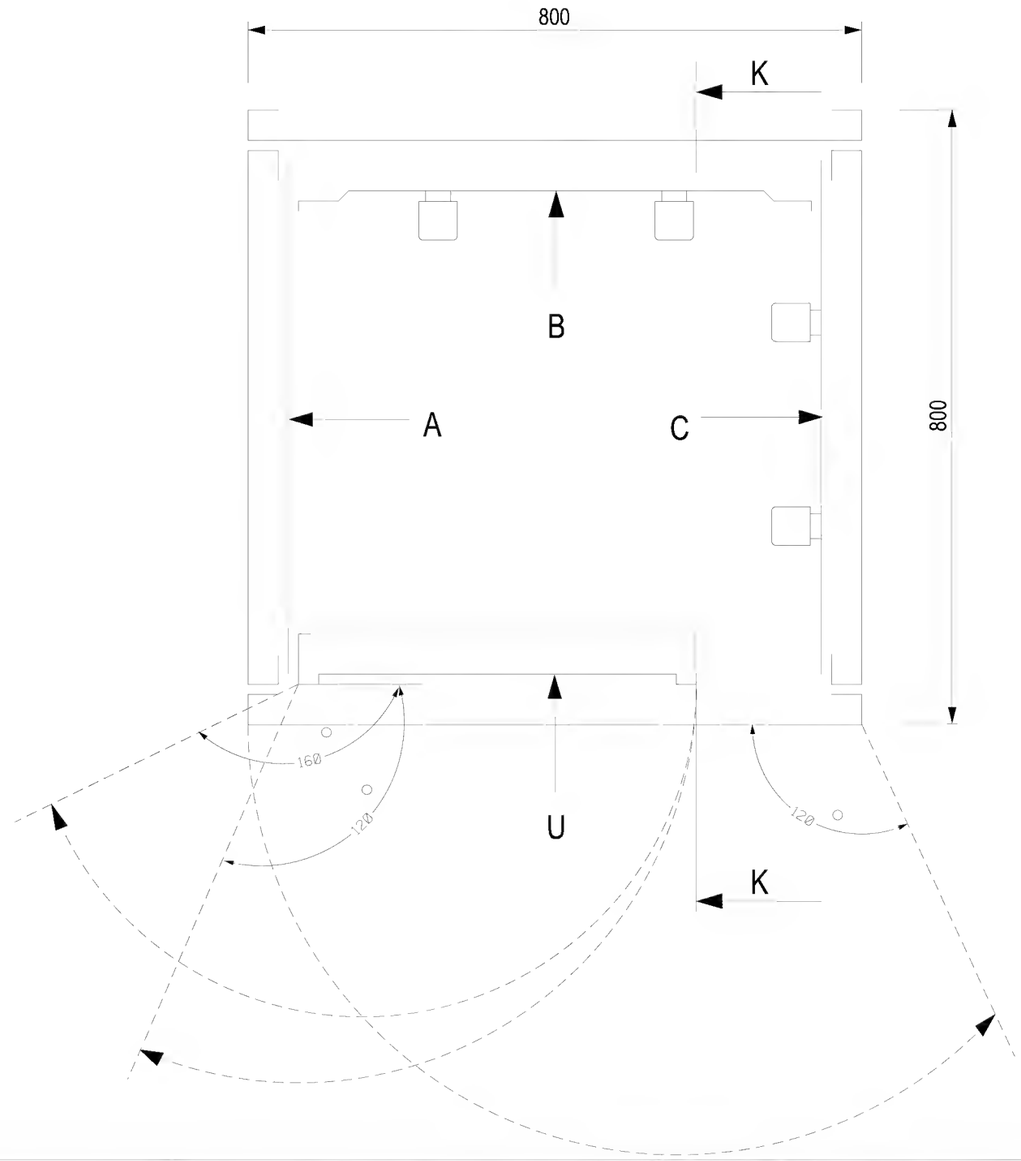
BASE PLATE/ FOUNDATION



PLAN



AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

ASSEMBLY DRAWING
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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-	C421	CD-322930	G03	G04	01

NG/D2-D (2012/01)
DMS VECTOR NGD200

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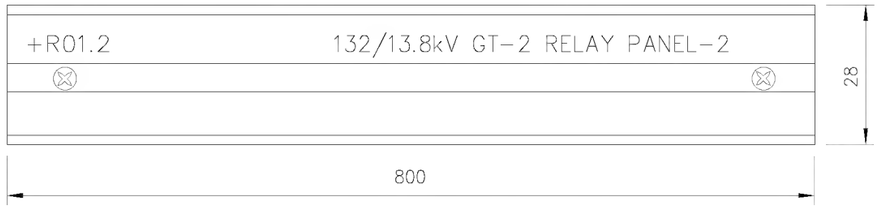
TOP VIEW FOR EARTHING BAR

U PLANE TOP LABEL



MANUFACTURING LABEL

ABB ABB Automation Co.Ltd.

PROJECT	:	National Grid SA S/S 8709
ORDER REFERENCE	:	2875 RF S13656
YEAR OF MANUFACTURE	:	2013
PANEL NO.	:	+R01.2
DRAWING NO.	:	S13656-CD-323931

MADE IN THE KINGDOM OF SAUDI ARABIA

U PLANE BOTTOM LABEL

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
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AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

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OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

ASSEMBLY DRAWING
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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NG/D2-D (2012/01)

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POWER SYSTEMS NETWORK MANAGEMENT
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.,
414, AL-KHARJ ROAD
SECOND INDUSTRIAL CITY
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company

CLIENT : National GridSA

PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY

SUBSTATION : S/S 8709

CONTRACT NO. : 11131113/00

TITLE : LIST OF APPARATUS +R01.2 [GT-2]

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR
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OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322930	L00	L01	01

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SR. NO.	GA REF.	SGH. REF.	D E S C R I P T I O N	SHEET NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
			RELAY CUBICLE- +R01.2 ACCOMODATING THE FOLLOWING					
1	U05.5001	87T-2	NUMERICAL BIASED DIFFERENTIAL PROTECTION RELAY	501	1	P643	ALSTOM	P643 32 ND 6M0 040K
			WITH THE FOLLOWING FEATURES	502				
			RATED CURRENT : 1A OR 5A					
			RATED FREQUENCY : 60 HZ					
			AUXILIARY VOLTAGE : 110 - 125V DC					
			BINARY INPUTS : 32					
			OUTPUT RELAYS : 16					
			COMMUNICATION PROTOCOL : IEC61850					
2	U12.5001	TS-1	TEST SWITCH FOR P633 RELAY (87T-2)	431	1	MMLG02	ALSTOM	MMLG02 R1AA 0001E
3	U12.5002	TS-2	TEST SWITCH FOR P633 RELAY (87T-2)	431	1	MMLG02	ALSTOM	MMLG02 R1AA 0001E
4	U12.5003	TS-3	TEST SWITCH FOR TRANS.MECH.PROTN	436	1	MMLG02	ALSTOM	MMLG02 R1AA 0001E
5	U16.5001	S86T2	PUSH BUTTON BLACK COLOUR, WITH 1NO+1NC CONTACTS	432	1	MP1-10B	ABB	1SFA 611 100 R1006
			FOR RESET OF LOCKOUT RELAY (86T2)			MCBH-20		1SFA 611 605 R1102
6	U20.101	TS-4	TEST SWITCH FOR MECH PROTN.	436	1	RTXP24	ABB	RK 926 315-AS
7	U24.5001	86T2	TRIP UNIT (86T2) COMPRISING OF:	432	1	MVAJ105	ALSTOM	MVAJ105 RA0804A
			TRIPPING RELAY : HIGH BURDEN TYPE					
			AUX.VOLTAGE : 110-125V DC					
			CONTACTS : 6NO + 4NC					
			FLAG : HAND RESET					
			CONTACT MECHANISM : HAND & ELECTRICALLY RESET					
8	U24.5002	94T2	TRIP UNIT (94T2) COMPRISING OF:	432	1	MVAJ101	ALSTOM	MVAJ101RA0800A
			AUX. VOLTAGE : 110/125V DC					
			CONTACT DATA : 10 NO					
			FLAG : HAND RESET					
			CONTACT MECHANISM : SELF RESET					

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
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DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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-	C421	CD-322930	L01	L02	01

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DMS VECTOR NGD200

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SR. NO.	GA REF.	SCH. REF.	D E S C R I P T I O N	SHT.	QTY.	TYPE	MAKE	ORDER INFORMATION
9			DUAL COIL TARGET RELAY FOR MECHANICAL PROTECTION	433	11	RXSF 1	ABB	RK 271 018-AN
			AUXILIARY VOLTAGE : 110-125V DC	434				
			CONTACT DATA : 3NO PER COIL	435				
			FLAG : HAND RESET	436				
	U28.101	23X	A: TRANSFORMER COOLER FAIL					
		63OL-1X	B: MAIN TANK OIL LEVEL LOW ALARM					
	U28.107	63QH-1X	A: MAIN TANK OIL LEVEL HIGH ALARM					
		63QL-2X	B: OLTC OIL LEVEL LOW ALARM					
	U28.301	63QH-2X	A: OLTC OIL LEVEL HIGH ALARM					
		96D-1X	B: MAIN TANK PRESS RELIEF ALARM					
	U28.307	96D-2X	A: OLTC PRESS RELIEF ALARM					
		96-1X	B: BUCHLZ STAGE-1 ALARM					
	U28.113	63QP-1X	A: OLTC PROTECTIVE ALARM					
		63GD-1X	B: GAS DETECT RELAY ALARM					
	U28.313	26D-1X	A: MAIN TR OIL TEMP STAGE-1 ALARM					
		26D-2X	B: MAIN TR OIL TEMP STAGE-2 ALARM					
	U28.119	49W1-5X	A: WDG TEMP STAGE-2 ALARM (HV)					
		49W1-6X	B: WDG TEMP STAGE-2 TRIP (HV)					
	U28.319	63 QSX	A: SUDDEN PRESSURE TRIP					
		96-2X	B: BUCHLZ STAGE-2 TRIP					
	U28.125	63 QP-2X	A: OLTC TRIP PROTECTIVE RELAY TRIP					
		49W2-5X	B: WDG TEMP HIGH STAGE-1 TRIP (LV)					
	U28.325	49 W2-6X	A: WDG TEMP HIGH STAGE-2 TRIP (LV)					
		FPX	B: FIRE PROTN.					
	U28.343	96-3	A: BUCHLZ CONSERVATOR ALARM					
		96-4	B: BUCHLZ CONSERVATOR TRIP					
	U28.131	74R2	DUAL TARCET RELAY REVERSE FLAC +R2 & R3 DC/SUPPLY SPARE	432	2	RXSF 1	ABB	RK 271 019-AN
	U28.331	74R3	AUXILIARY VOLTACE : 110-125V DC	436				
			CONTACT DATA : 1NO + 2NC PER COIL					
			FLAG : SELF RESET					
	U28.137	96/63X	HIGH SPEED TRIP RELAY)					
	U28.143	49X	AUXILIARY VOLTAGE : 110-125V DC	436	2	RXMS 1	ABB	RK 216 463-AP
			CONTACT DATA : 6NO					
	U28.337	T1	TIMER FOR MECHANICAL PROTECTION					
			AUXILIARY VOLTAGE : 110-125V DC	436	1	RXKL 1	ABB	1MRK 000 066-AB
			CONTACT DATA : 2C/O					

AS-BUILT BY _____ DATE _____

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01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

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SR. NO.	GA REF.	SCH. REF.	DESCRIPTION	SHT.	QTY.	TYPE	MAKE	ORDER INFORMATION
10			MCB 2 POLE 6A, FOR DC SUPPLY	416	3	S282 UC K6	ABB	GHS S282 0164 R0317
			WITH 2NC AUXILIARY CONTACT			S2-H02		CH S270 191 6R0003
	U39.5001	Q1	R2€ SUPPLY					
	U39.5002	Q2	R3€ SUPPLY					
	U36.5001	Q3	TC2 SUPPLY					
11	U39.5003	C01	CONVENIENCE OUTLET 10A, 127V AC	411	2	USM45&USMS45	ABB	74140 & 74180
		C02	CONVENIENCE OUTLET 10A, 220V AC					
		C1,C2	MINIATURE CIRCUIT BREAKER, 2 POLE, 10A FOR	411	2	S202P-K10	ABB	2CDS 252 001 R0427
			CONVENIENCE OUTLET WITH AUXILIARY SWITCH, 1NO + 1NC CONTACTS			S2C-H11L		CH 270 1917 R001
		C3	THERMOSTAT FOR SPACE HEATER, 5-33°C	411	1	SK 3110	RITTAL	SK 3110
12	U39.5004	TJ	TELEPHONE JACK 1GANG 4WIRE	411	1	EDF410	EDISON	EDF410
		C7	ON/OFF SWITCH FOR SPACE HEATER	411	1	M2SS1-10B	ABB	1SFA 611 200 R1006
						MCBH-10		1SFA 611 605 R1101
		DS	DOOR SWITCH FOR CONTROL OF CUBICLE INTERNAL ILLUMINATION LAMP	411	1	LS30P13B02	ABB	1SBV 010 213 R1202
		IL	INTERNAL ILLUMINATION CUBICLE LAMP SUITABLE FOR	411	1	T4	SUNON	SP-20W
			127V AC, 60Hz SUPPLY					
		SH	SPACE HEATER, 150W, 120V, 60Hz	411	1	RICA	GRUPPO	1FZEK006C001
13		R1	FIXED RESISTOR FOR TRIP CIRCUIT SUPERVISION CKT.	491	2	GRF 30/200	DANOTHERM	GRF 30/200
		R2	2.5Kohm,15W					

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CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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SR. NO.	CA REF.	SCH. REF.	D E S C R I P T I O N	SHEET. NO.	QTY.	TYPE	MAKE	ORDERING INFORMATION
13		X1	BLOT CONNECTING TERMINAL BLOCKS DISCONNECTIBLE FOR CT CIRCUITS	502	45	OTTA 6T P/P	PHOENIX	0790462
		X2	SPRING LOADED TERMINAL BLOCKS DISCONNECTIBLE FOR VT CIRCUITS	502	10	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
		X3	SPRING LOADED TERMINAL BLOCKS DISCONNECTIBLE FOR AC CIRCUITS	502	10	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
		X42	SPRING LOADED TERMINAL BLOCK FOR DC EXT. CIRCUITS	502	20	D6/8.ST1.RS	ENTRELEC	1SNA 115 831 R0400
		X52	SPRING LOADED TERMINAL BLOCK FOR DC PROTN. CIRCUITS	502	90	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		X6	SPRING LOADED TERMINAL BLOCKS DISCONNECTIBLE FOR STN.-COM ALARM CIRCUITS	502	5	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		X62	KNIFE TYPE TERMINAL BLOCKS DISCONNECTIBLE FOR STN.-COM ALARM CIRCUITS	502	20	M6/8.SNB	ENTRELEC	1SNA 115 688 R2500
		XTJ	SPRING LOADED TERMINAL BLOCK KNIFE FOR TELEPHONE JACK	502	5	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		XSH	SPRING LOADED TERMINAL BLOCKS FOR SPACE HEATER	502	3	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		XD	TERMINAL BLOCKS WITH BLOCKING DIODE, Vrrm=1kV, If=3A	436	10	M4/6.S	ENTRELEC	11521310
			AND SURGE TRAP, ENERGY ABSORPTION RATING 8J (10/1000mS)			IN5408	MEJDAF	02-049
						V150ZA1	RS	239-270
		X92	SPRING LOADED TERMINAL BLOCK KNIFE TYPE FOR SPARE CONTACTS	502	20	M6/8.RS	ENTRELEC	1SNA 115 685 R1200
		X53	SPRING LOADED TERMINAL BLOCK FOR DC PROTN. CIRCUITS	502	25	M6/8.RS	ENTRELEC	1SNA 115 685 R1200

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DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
U05.5001	U05.5001 87T-2	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U12.5001	U12.5001 TS-1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U12.5002	U12.5002 TS-2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U12.5003	U12.5003 TS-3	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U12.5004	U12.5004 TS-4	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U16.5001	U16.5001 S86T2	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U20.101	U20.101 TS-4	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U24.5001	U29.5001 86T2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U24.5002	U29.5002 94T2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.101	U28.101 23X 63QL-1X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.107	U28.107 63QH-1X 63QL-2X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.301	U28.301 63QH-2X 96D-1X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.307	U28.307 96D-2X 96-1X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.113	U28.113 63QP-1X 63QD-1X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.313	U28.313 26D-1X 26D-2X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.119	U28.119 49W1-5X 49W1-6X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.319	U28.319 63Q-5X 96-2X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.125	U28.125 63QP-2X 49W2-5X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.325	U28.325 49W2-6X SPARE	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.131	U28.131 74R2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.331	U28.331 74R3	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.137	U28.137 63/49/96X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.337	U28.337 T1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.149	U28.149 49X	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.349	U28.349 96-3/96-4	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.143	U28.143 R1	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm
U28.343	U28.343 R2	ALUMINUM PAPER FOIL	BLACK LETTERS	50X10mm	3mm

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AS-BUILT BY _____ DATE _____

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00	13 04	FOR APPROVAL

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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LABEL REF.	LABEL ENGRAVING	MATERIALS	ENGRAVING	LABEL SIZE	LETTER SIZE
C1	C1 127V AC SUPPLY MCB	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C2	C2 220V AC SUPPLY MCB	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C3	C3 THERMOSTAT	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
C7	C7 ON/OFF SWITCH	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
DS	DS DOOR SWITCH	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
IL	IL ILLUMINATION LAMP	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
SH	SH SPACE HEATER	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5001	Q1 R2+SUPPLY	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5002	Q2 R3+SUPPLY	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5003	C01,C02 OUTLET	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U39.5004	TJ TELEPHONE JACK	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm
U36.5001	Q3 TC-2+SUPPLY	TRAFOLITE	BLACK LETTERS ON WHITE BACKGROUND	50X15mm	4mm

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LIST OF APPARATUS

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

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POWER SYSTEMS NETWORK MANAGEMENT
PROTECTION AND SUBSTATION AUTOMATION SYSTEMS
WBS NO: S-13656

ABB AUTOMATION COMPANY LTD.
414, AL-KHARJ ROAD
SECOND INDUSTRIAL CITY
RIYADH-11383 K.S.A

CONTRACTOR : ABB Contracting Company

CLIENT : National GridSA

PROJECT : CONSTRUCTION OF NEW 132/13.8kV SS 8709 IN AL-KHARJ CITY

SUBSTATION : S/S 8709

CONTRACT NO. : 11131113/00

TITLE : SCHEMATICS DRAWINGS (+R01.1,+R01.2)

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COVER SHEET
132/13.8KV GT-2 RELAY PANEL-+R01.1/+R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
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CONTENTS	ABB SHT.NO.	REV.00	REV.01	REV.02
COVER SHEET	000	X	X	
CONTENTS SHEET	001	X	X	
CONTENTS SHEET	002	X	X	
CRAPHICAL SYMBOLS FOR DIACRAMS	011	X	X	
CRAPHICAL SYMBOLS FOR DIACRAMS	012	X	X	
COMMON LEGEND	013	X	X	
FERULE AND WIRINC DETAILS	014	X	X	
PRIMARY SYSTEM	051–055	X	X	
AC SUPPLY FOR ILLUMINATION & POWER SOCKET	211	X	X	
CUB. LIGHTING, HEATER & SOCKET ALARM CKT.	212	X	X	
DC SUPPLY DISTRIBUTION	216	X	X	
CT CIRCUITS	221–223	X	X	
VT CIRCUITS	224	X	X	
87T–1 BINARY INPUTS	227	X	X	
87T–1 BINARY INPUTS	228	X	X	
MAIN–1 TRAF DIFFL. PROTECTION TRIP RELAY CKT.	232	X	X	
CBF & BUSBAR–1 TRIP RELAY CIRCUIT	276	X	X	
BUSBAR–2 TRIP RELAY CIRCUIT	277	X	X	
TRIP COIL–1 SUPERVISION CIRCUIT	291	X	X	
CLOSE BLOCK & BF INI CKT.	292	X	X	
CONTACTS FOR ACSE INI & LV TRIPPING TC	293	X	X	
ACSE INI & LV CLOSE BLOCK CIRCUIT	294	X	X	
CONTACTS FOR TRIP CIRCUIT–2 & BFI	295	X	X	

CONTENTS	ABB SHT.NO.	REV.00	REV.01	REV.02
CONTACTS FOR U/F LOAD SHEDDINC	296	X	X	
STN COMMON ALARM CIRCUITS	298	X	X	
LOR SPARE CONTACTS	299	X	X	
BLOCK REFERENCE	301–303	X	X	
TERMINAL BLOCK REFERENCE +R01.1	304	X	X	

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CONTENTS SHEET

132/13.8KV GT-2 RELAY PANEL-1/2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

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CONTENTS	ABB SHT.NO.	REV.00	REV.01	REV.02
AC SUPPLY FOR ILLUMINATION & POWER SOCKET	411	X	X	
CUB. LIGHTING, HEATER & SOCKET ALARM CKT.	412	X	X	
DC SUPPLY DISTRIBUTION FOR SYSTEM SYNCHRONISER	416	X	X	
CT CIRCUIT 87T-2 RELAY	421-422	X	X	
CT CIRCUIT 87T-2 RELAY	423	X	X	
CT & VT CIRCUITS 87T-2 RELAY	424	X	X	
87T-2 BINARY INPUTS	429	X	X	
87T-2 BINARY INPUTS	430	X	X	
MAIN-2 DIFF. PROTECTION TRIP RELAY CKT.	432	X	X	
TRANS.MECH.PROTN.CONTACT MULTI.CKT	433	X	X	
TRANS.MECH.PROTN.CONTACT MULTI.CKT	434	X	X	
TRANS.MECH.PROTN.CONTACT MULTI.CKT	435	X	X	
TRANS.MECH.PROTN.CONTACT MULTI.CKT	436	X	X	
CB K305 TRIP CIRCUIT-2 SUPERVISION CIRCUIT	491	X	X	
BF INI & CLOSE BLOCK CIRCUIT	492	X	X	
TRANSFORMER MECHANICAL.PROTN.	493	X	X	
CONTACTS FOR TRIP AND CLOSE BLOCK	494	X	X	
CONTACTS FOR U/F LOAD SHEDDING	496	X	X	
MECH PROTN. ALARM CIRCUIT	498	X	X	
STN COMMON ALARM CIRCUIT	499	X	X	
BLOCK REFERENCE	501	X	X	
BLOCK REFERENCE	502	X	X	
TERMINAL BLOCKS REFERENCE +R01.2	106	X	X	
TERMINAL BLOCKS REFERENCE +R01.2	507	X	X	

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CONTENTS SHEET
132/13.8KV GT-2 RELAY PANEL-1/2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
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SYMBOL	DESCRIPTION
	FRAME CONNECTION
	EARTH CONNECTION
	RESISTOR
	VARIABLE RESISTOR
	RESISTOR WITH PRESET ADJUSTMENT
	CAPACITOR
	SEMICONDUCTOR DIODE USED AS A CAPACITIVE DEVICE
	OPEN CONTACT, MAKE CONTACT
	CLOSED CONTACT, BREAK CONTACT
	CHANGE-OVER CONTACT, BREAK BEFORE MAKE
	MAKE CONTACT WHICH IS EARLY WHEN OPERATING AND LATE WHEN RELEASING
	BREAK CONTACT WHICH IS LATE WHEN OPERATING AND EARLY WHEN RELEASING
	SWITCHING DEVICE WITH MANUAL CONTROL
	MAKE CONTACT DELAYED WHEN OPERATING
	BREAK CONTACT DELAYED WHEN RELEASING
	MAKE CONTACT DELAYED WHEN OPERATING AND RELEASING
	MAIN CONTACT OF A SWITCH DISCONNECTOR
	MAIN CONTACT OF A DISCONNECTOR

SYMBOL	DESCRIPTION
	MAIN CONTACT OF A CIRCUIT BREAKER
	PASSING MAKE CONTACT CLOSING MOMENTARILY DURING OPERATION AND RELEASE
	BREAK CONTACT DELAYED WHEN OPERATING
	MAKE CONTACT DELAYED WHEN RELEASING
	TWO MECHANICAL LINKS CROSSING WITHOUT CONNECTION
	JUNCTION OF MECHANICAL LINKS
	AUTOMATIC RESET
	NON-AUTOMATIC RESET
	SWITCHING DEVICE WITH MANUAL OPERATION AND WITH AUTOMATIC RESET
	SWITCHING DEVICE WITH MANUAL OPERATION AND WITH NON-AUTOMATIC RESET
	CHANGE-OVER SWITCHING DEVICE WITH MANUAL CONTROL AUTOMATIC RESET FROM POSITION 1-2 TO THE NEUTRAL POSITION
	RELAY WITH MAKE CONTACT
	RELAY WITH CHANGE-OVER CONTACT
	RELAY WITH MAKE CONTACT, DELAYED WHEN OPERATING
	RELAY WITH MAKE CONTACT, DELAYED WHEN RELEASING
	RELAY WITH MAKE CONTACT, DELAYED WHEN OPERATING AND RELEASING

SYMBOL	DESCRIPTION
	RELAY WITH TWO MAKE CONTACTS, ONE OF THEM DELAYED WHEN OPERATING
	RELAY WITH TWO ACTUATORS AND A TWO STABLE POSITIONS
	SIGNALLING LAMP
	MECHANICAL INDICATOR WITH AUTOMATIC RESET
	MECHANICAL INDICATOR WITH NON-AUTOMATIC RESET
	ELECTRICALLY CONTROLLED MECHANICAL INDICATOR WITH AUTOMATIC RESET
	ELECTRICALLY CONTROLLED MECHANICAL INDICATOR WITH NON-AUTOMATIC RESET
	RELAY WITH MECHANICAL INDICATOR
	ELECTRO-MECHANICAL POSITION INDICATOR WITH ONE DE-ENERGIZED AND ONE OPERATED POSITION
	ELECTRO-MECHANICAL POSITION INDICATOR WITH ONE DE-ENERGIZED AND TWO OPERATED POSITION
	BELL, BUZZER
	SIREN , HORN

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OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

GRAPHICAL SYMBOLS FOR DIAGRAMS
132/13.8KV GT-2 RELAY PANEL-1/2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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SYMBOL	DESCRIPTION
	FUSE / LINK
	FUSE WITH THE SUPPLY SIDE INDIGATED
	SINGLE-PHASE TRANSFORMER WITH TWO SEPARATE WINDINGS (TWO ALTERNATIVE FORMS)
	SINGLE-PHASE TRANSFORMER WITH THREE SEPARATE WINDINGS (TWO ALTERNATIVE FORMS)
	SINGLE-PHASE TRANSFORMER WITH FERRO MAGNETIG GORE
	SINGLE-PHASE VOLTAGE TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)
	SINGLE-PHASE VOLTAGE TRANSFORMER WITH TWO SEGONDARY WINDINGS (MULTI-LINE AND SINGLE-LINE REPRESENTATION)
	GURRENT TRANSFORMER (MULTI-LINE AND SINGLE-LINE REPRESENTATION)
	CURRENT TRANSFORMER WITH TWO CORES (MULIT-LINE AND SINGLE-LINE REPRESENTATION)
	GURRENT TRANSFORMER WITH TWO SEGONDARY WINDINGS ON ONE GORE (MULTI-LINE AND SINGLE-LINE REPRESENTATION)
~	FILTER
~	HIGH-PASS FILTER
~	BAND-PASS FILTER
V	VOLTMETER
A	AMMETER

SYMBOL	DESCRIPTION
W	WATTMETER
Var	VARMETER
PF	POWER FACTOR METER
	POSITION INDICATOR
	SYNCHROSCOPE
V	RECORDING VOLTMETER
W	REGORDING WATTMETER
h	HOUR METER
Wh	WATT-HOUR METER
Wh	WATT-HOUR METER FOR ENERGY FROM A BUSBAR SYSTEM
	ELEMENT WITH STATIG INPUT
	ELEMENT WITH STATIG NEGATED INPUT
	ELEMENT WITH STATIG NEGATED OUTPUT
>	ELEMENT WITH DYNAMIC INPUT
>	ELEMENT WITH DYNAMIC NEGATED INPUT
	ELEMENT WITH INHIBITING INPUT

SYMBOL	DESCRIPTION
	ELEMENT WITH NEGATED INHIBITING INPUT
	ELEMENT WITH INPUT WHIGH DOES NOT GARRY ANY LOGIG INFORMATION
X	ELEMENT WITH POSTPONED OUTPUT
&	AND-ELEMENT WITH TWO INPUTS
>1	OR-ELEMENT WITH TWO INPUTS
≥2	LOGIG THRESHOLD ELEMENT WITH FOUR INPUTS AND THRESHOLD VALUE 2
=2	ELEMENT WITH THREE INPUTS FOR "2 AND ONLY 2"
=1	EXGLUSIVE OR-ELEMENT WITH THREE INPUTS
=	LOGIG IDENTITY ELEMENT WITH THREE INPUTS
>n/2	MAJORITY ELEMENT WITH THREE INPUTS
1	NEGATOR
&	NAND ELEMENT WITH TWO INPUTS
>1	NOR ELEMENT WITH TWO INPUTS
X Y	BISTABLE ELEMENT

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OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

GRAPHICAL SYMBOLS FOR DIAGRAMS

132/13.8KV GT-2 RELAY PANEL-1/2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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LEGENDS

±R1	DC SUPPLY – MAIN PROTECTION
±R2	DC SUPPLY – SECONDARY PROTECTION
±R3	DC SUPPLY – BACK UP PROTECTION
±IT	DC SUPPLY – INTER TRIP
FL	DC SUPPLY – FLASHING CIRCUIT
BB RS±	DC SUPPLY – BUS BAR – PROTECTION RESET
BB CBF±/CBF±	DC SUPPLY – CBF PROTECTION
R	RESET BUS – ALARM SYSTEM
CR	CONTROL ROOM
ECC	ENERGY CONTROL CENTRE
LOCAL	THE LOCATION OF CONTROLLED DEVICE
REMOTE	ANY OTHER LOCATION NOT LOCAL
ON	CB NORMALLY OPEN AUXILIARY CONTACT
OFF	CB NORMALLY CLOSED AUXILIARY CONTACT
A	COMMON
T	TEST POSITION
S	SERVICE POSITION
CS	CLOSE IN SERVICE POSITION
CT	CLOSE IN TEST POSITION
LS	LOCAL SERVICE
LT	LOCAL TEST
LC	LOCAL CLOSE
LO	LOCAL OPEN
RO	REMOTE OPEN
OP	OPERATE
RE	RESET

NOTES

LABELS

WHITE LABEL WITH BLACK LETTERING WILL BE PROVIDED FOR ALL MOUNTED APPARATUS EQUIPMENT IDENTIFICATION AND FUNCTION REFERENCE LABEL WILL BE PROVIDED FOR FRONT MOUNTED EQUIPMENTS OF THE PANEL AND EQUIPMENT IDENTIFICATION LABEL WILL BE PROVIDED FOR INTERNALLY MOUNTED EQUIPMENTS

WIRING

PVC INSULATED 600V GRADE
2.5 SQ.mm. YELLOW COLOURED FOR CT CIRCUITS
2.5 SQ.mm. RE COLOURED FOR VT CIRCUITS
1.5 SQ.mm. GREY COLOURED FOR DC SUPPLY, SCADA AND CONTROL CIRCUITS
2.5 SQ.mm. BLACK COLOURED FOR AVC AND AC CIRCUITS
2.5 SQ.mm. YELLOW/GREEN COLOURED FOR EARTHING CONNECTIONS
FOLLOWING MARKERS SHALL BE PROVIDED ON FOLLOWING WIRES:
+ SIGN FOR DC + WIRE
– SIGN FOR DC – WIRE

LUGS

A. CT CIRCUITS– RING TYPE
B. OTHER CIRCUITS – SPADE TYPE

FERULLING

YELLO TUBE 3.2 mm FOR 1.5SQ mm WIRES AND 4.2 FOR 2.5 SQ mm WIRES
(AS PER 31 – TMSS–1, RE.0)

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COMMON LEGEND
132/13.8KV GT-2 RELAY PANEL-1/2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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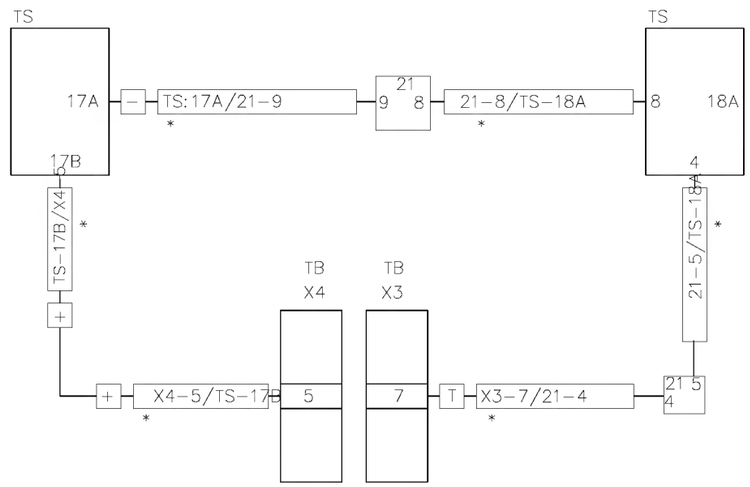
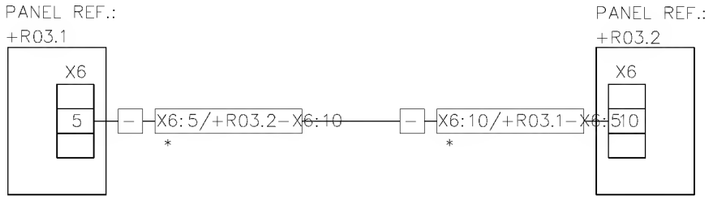
FOR 132kV RELAY & CONTROL, PROTN. PANELS



AS PER IEC-391 FIG 14c (W/O SUPPLEMENTARY/IDENTIFICATION MARK)

FOR 132kV PANELS INTERPANEL WIRING



AS PER IEC-391 FIG 14d (W/O SUPPLEMENTARY/IDENTIFICATION MARK)

WIRES – PVC insulated,stranded, coaled annealed copper conductar graded for 1000V	a. CT Circuits – 2.5 Sqmm PVC Yellow colour
	b. VT Circuits – 1.5 Sqmm PVC Red colour
	c. DC, & CONTROL Circuits – 1.5 Sqmm PVC Grey colour
	d. Alarm Circuits – 1.0 Sqmm PVC Blue colour
	e. AVC & AC Circuits – 2.5 Sqmm PVC Black colour
	f. Earth Circuits – 2.5 Sqmm PVC Yellow/Green colour
LUGS – Pre-Insulated	a(CT Circuits – Ring type
	b(Other Circuits – Spade type

NOTE:1 ADDITIONAL MARKING AS APPLICABLE

NOTE:2 FERRULE NUMBERING WILL BE BLACK LETTERS ON YELLOW TUBE
3.2 mm for 1.5 sq mm wires and
4.2 mm for 2.5 sq mm wires
(As per 31-TMSS-1, REV 0)

NOTE:3 STARTING POINT OF THE FERRULE LEFT TO RIGHT

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FERRULE AND WIRING DETAILS
132/13.8KV GT-2 RELAY PANEL-1/2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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MANUFACTURER	SCHEMATICS DWG.NO	PANEL DESCRIPITION	PANEL REFERENCE
ABB PROTECTION & SUBSTATION AUTOMATION		SS 8709 132kV RELAY PANELS	
	CD-322931	132/13.8kV GT-2 RELAY PANEL -1	+R01.1
		132/13.8kV GT-2 RELAY PANEL -2	+R01.2
	CD-322931	132/13.8kV GT-2 RELAY PANEL -1	+R01.1
		132/13.8kV GT-2 RELAY PANEL -2	+R01.2
	CD-322934	132/13.8kV GT-3 RELAY PANEL -1	+R04.1
		132/13.8kV GT-3 RELAY PANEL -2	+R04.2
	CD-322936	132/13.8kV TRANSFORMER-1,2& 3 AVC PANEL	+AVC
	CD-322922	132KV SPARE-1 UGF RELAY PANEL -1	+R07.1
		132KV SPARE-1 UGF RELAY PANEL -2	+R07.2
	CD-322916	132KV 8020 UGF RELAY PANEL -1	+R02.1
		132KV 8020 UGF RELAY PANEL -2	+R02.2
	CD-322919	132KV 8710 UGF RELAY PANEL -1	+R01.1
		132KV 8710 UGF RELAY PANEL -2	+R01.2
	CD-322925	132KV SPARE-2 UGF RELAY PANEL -1	+R06.1
		132KV SPARE-2 UGF RELAY PANEL -2	+R06.2
	CD-323012	132KV FOIP PANEL	+FOIP
	CD-322946	132kV BUS COUPLER-A	+R130
	CD-322948	132kV BUS COUPLER-B	+R230
	CD-322950	132kV BUS SECTION	+R120
	CD-322991	132kV BUSBAR PROTECTION MAIN-1 CENTRAL UNIT PANEL	+BB1-1
	CD-322993	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BB1-2
	CD-322995	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BB1-3
	CD-322997	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BB1-4
	CD-322999	132kV BUSBAR PROTECTION MAIN-1 BAY UNIT PANEL	+BB1-5
	CD-323001	132kV BUSBAR PROTECTION MAIN-2 CENTRAL UNIT PANEL	+BB2-1
	CD-323003	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BB2-2
	CD-323005	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BB2-3
	CD-323007	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BB2-4
	CD-323009	132kV BUSBAR PROTECTION MAIN-2 BAY UNIT PANEL	+BB2-5

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DRAWING REFERENCES
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S/S 8709-132/13.8KV IN AL-KHARJ CITY
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MANUFACTURER	SCHEMATICS DWG.NO	PANEL DESCRIPITION	PANEL REFERENCE
ABB PROTECTION & SUBSTATION AUTOMATION		SS 8709 13.8KV RELAY PANELS	
	CD-322952	13.8KV Capacitor Bank-1 Protection Panel	+CBP-1
	CD-322954	13.8KV Capacitor Bank-2 Protection Panel	+CBP-2
	CD-322956	13.8KV Capacitor Bank-2 Protection Panel	+CBP-3
	CD-322958	13.8 KV ACCS PANEL	+ACCS
	CD-322962	13.8KV ACSE PANEL	+ACSE
	CD-322968	13.8KV Under Voltage Load Shedding Panel	+UVLS
	CD-322964	13.8KV Under Frequency Load Shedding Panel-1	+UFLS01
	CD-322966	13.8KV Under Frequency Load Shedding Panel-2	+UFLS02

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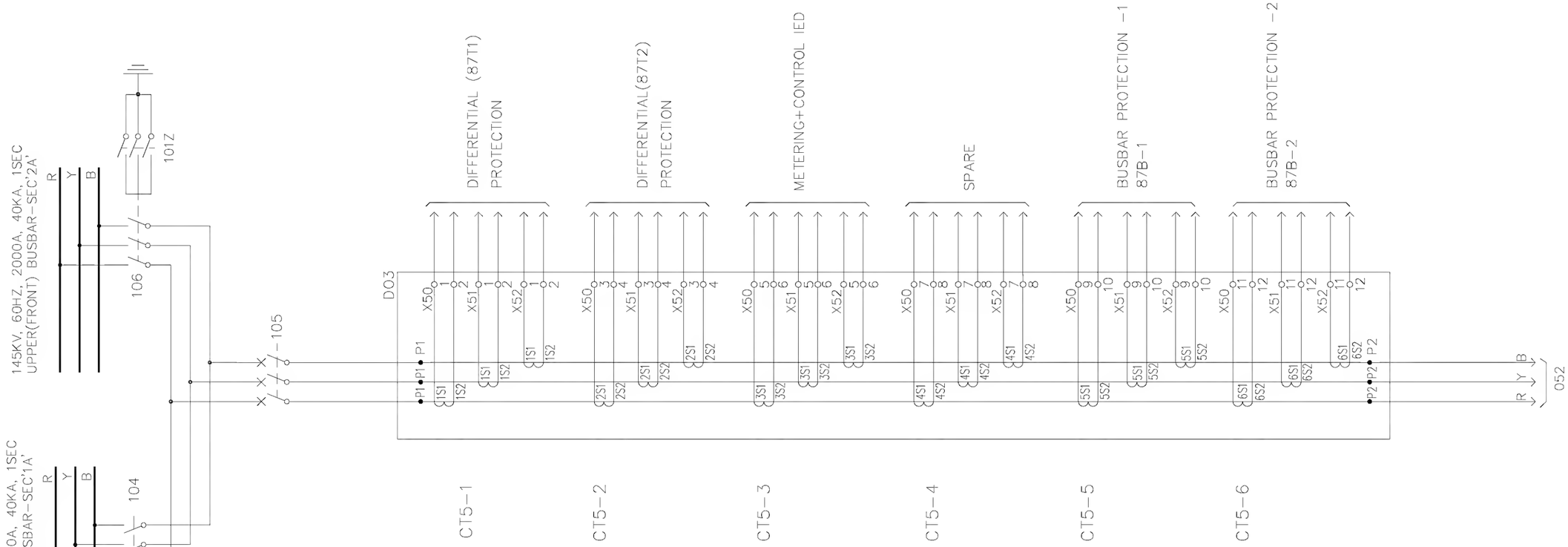

CT	RATIO	CLASS	VK IN VOLTS	IMAG @ VK IN mA	RCT IN (OHMS)	BURDEN IN VA	FUNCTION
CT5-1	300/1A	X	>360	<50	<1	–	87T1
CT5-2	300/1A	X	>360	<50	<1	–	87T2
CT5-3	300/1A	0.2Fs5	–	–	–	30	METERING+ CONTROL
CT5-4	300/1A	5P20	–	–	–	30	SPARE
CT5-5	2000/1A	X	>600	<25	<5	–	87B MAIN-1
CT5-6	2000/1A	X	>600	<25	<5	–	87B MAIN-2

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PRIMARY SYSTEM (GT-2)
132/13.8KV GT-2 RELAY PANEL-1/2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
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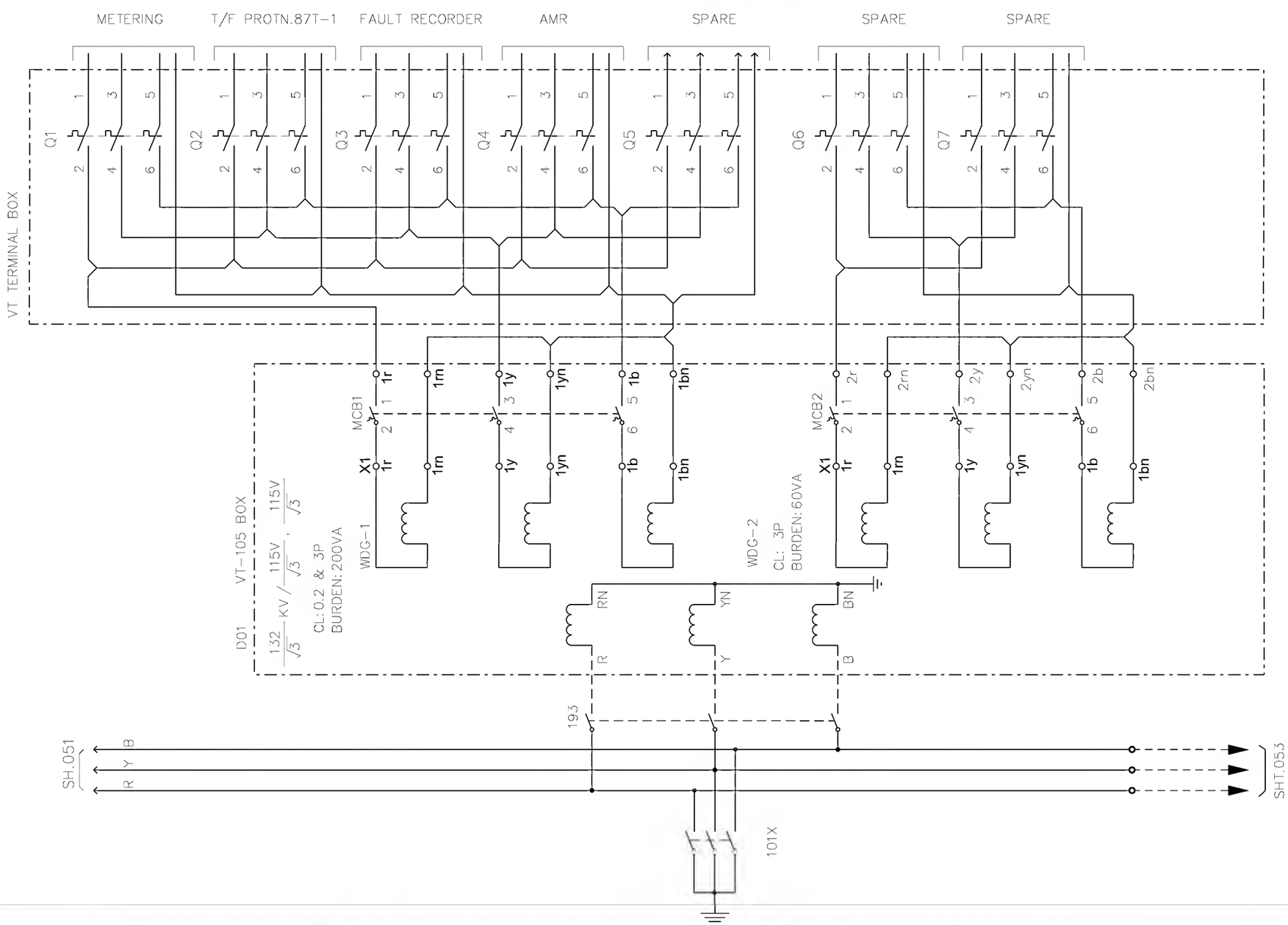

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PRIMARY SYSTEM (GT-2)

132/13.8KV GT-2 RELAY PANEL-1/2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

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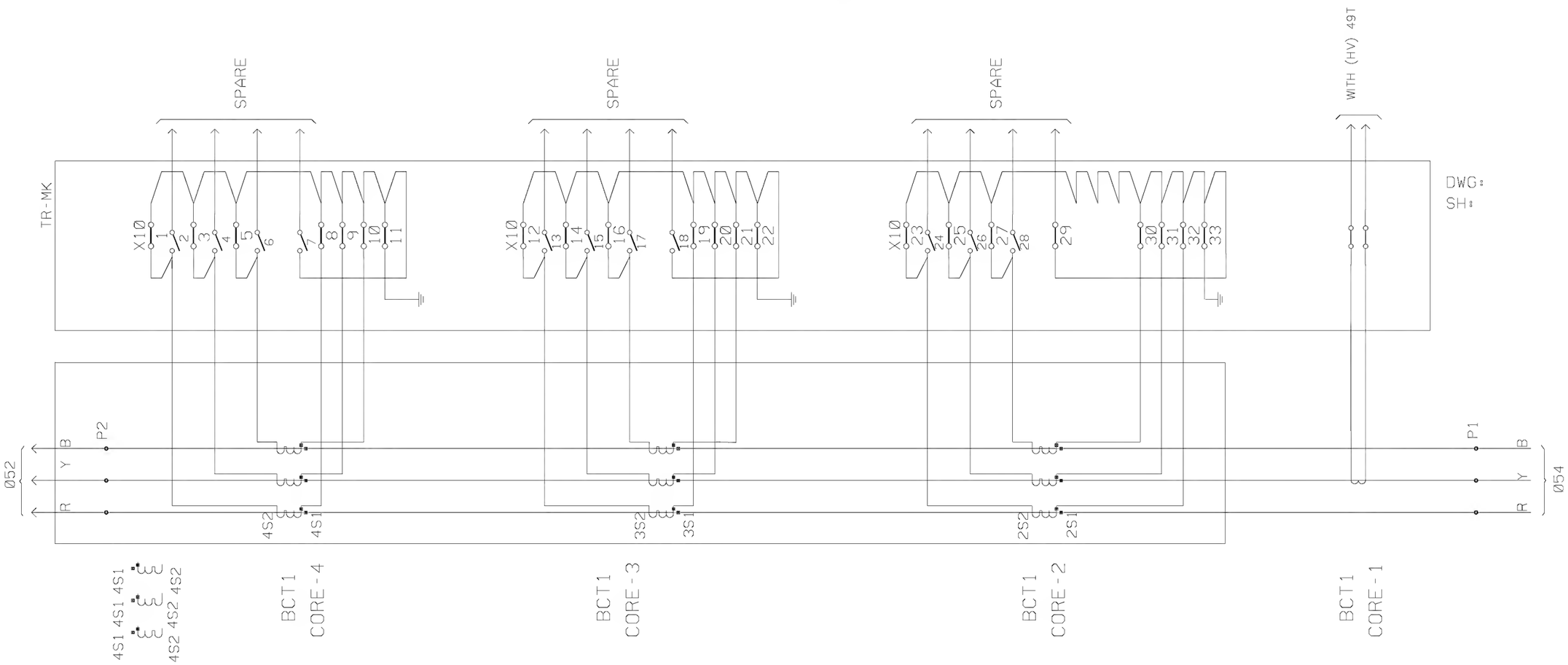

CT	RATIO	CLASS	VK IN VOLTS	IMAG @ VK IN MA	RCT IN (OHMS)	BURDEN IN VA	FUNCTION
BCT1-4	300/1A	X	>360V	<50	≤1	-	SPARE
BCT1-3	300/1A	10P10	-	-	-	30	SPARE
BCT1-2	1200-800/1A	X	>1400	<25MA	≤2	-	SPARE
BCT1-1 (YPH)ONLY	323/2A	3FS10	-	-	-	10	WTI(HV)-49T

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S/S 8709-132/13.8KV IN AL-KHARJ CITY
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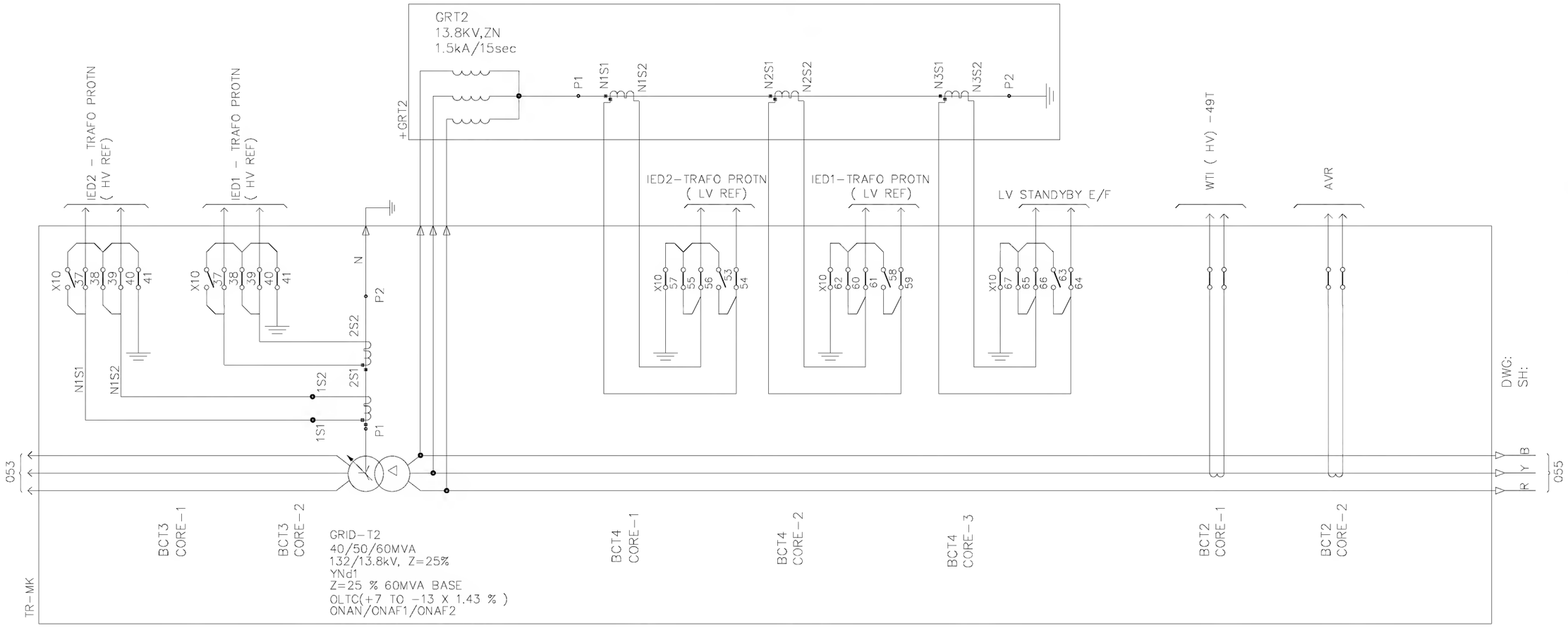

CT	RATIO	CLASS	VK IN VOLTS	IMAG @ VK IN MA	RCT IN (OHMS)	BURDEN IN VA	FUNCTION
BCT2-1 (YPH)ONLY	2510/2A	3FS10	-	-	-	10	WTI(LV)-49T
BCT2-2 (YPH)ONLY	2510/5A	0.5	-	-	-	50	AVR
BCT3-1	300/1A	X	>360	<50MA	<1	-	IED2-TRAFO PROTN(HV REF)
BCT3-2	300/1A	X	>360	<50MA	<1	-	IED1-TRAFO PROTN(HV REF)
BCT4-1	3000/1A	X	>765	<25MA	<10	-	IED2-TRAFO PROTN(LV REF)
BCT4-2	3000/1A	X	>765	<25MA	<10	-	IED1-TRAFO PROTN(LV REF)
BCT4-3	800/5A	10P10	-	-	-	15	LV STANDBY E/F

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

PRIMARY SYSTEM (GT-2)
132/13.8KV GT-2 RELAY PANEL-1/2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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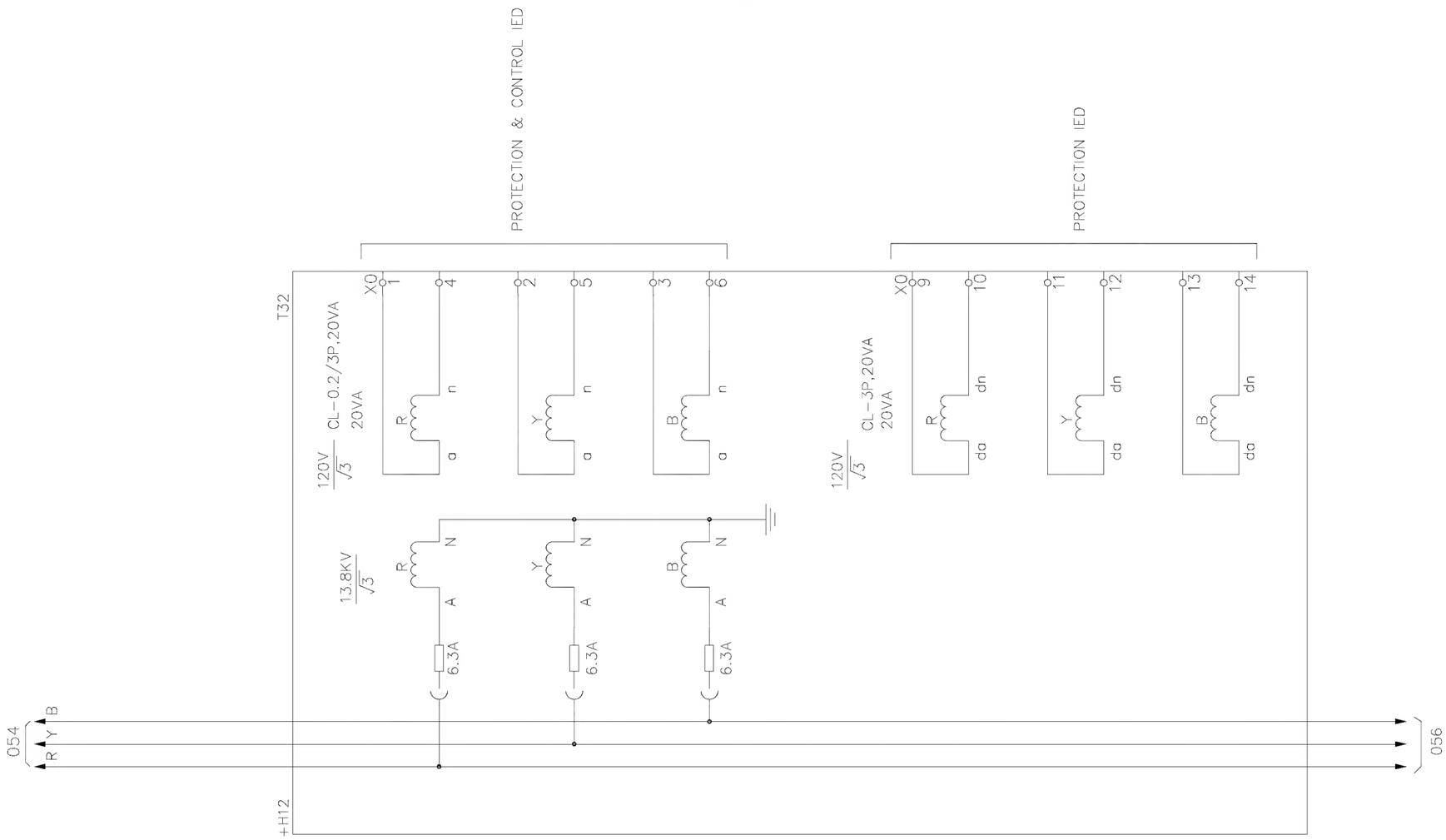

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	PRIMARY SYSTEM (GT-2)	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
01 / 13 49 / FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY JKR	132/13.8KV GT-2 RELAY PANEL-1/2		
00 / 13 04 / FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED _____	S/S 8709-132/13.8KV IN AL-KHARJ CITY		
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA		

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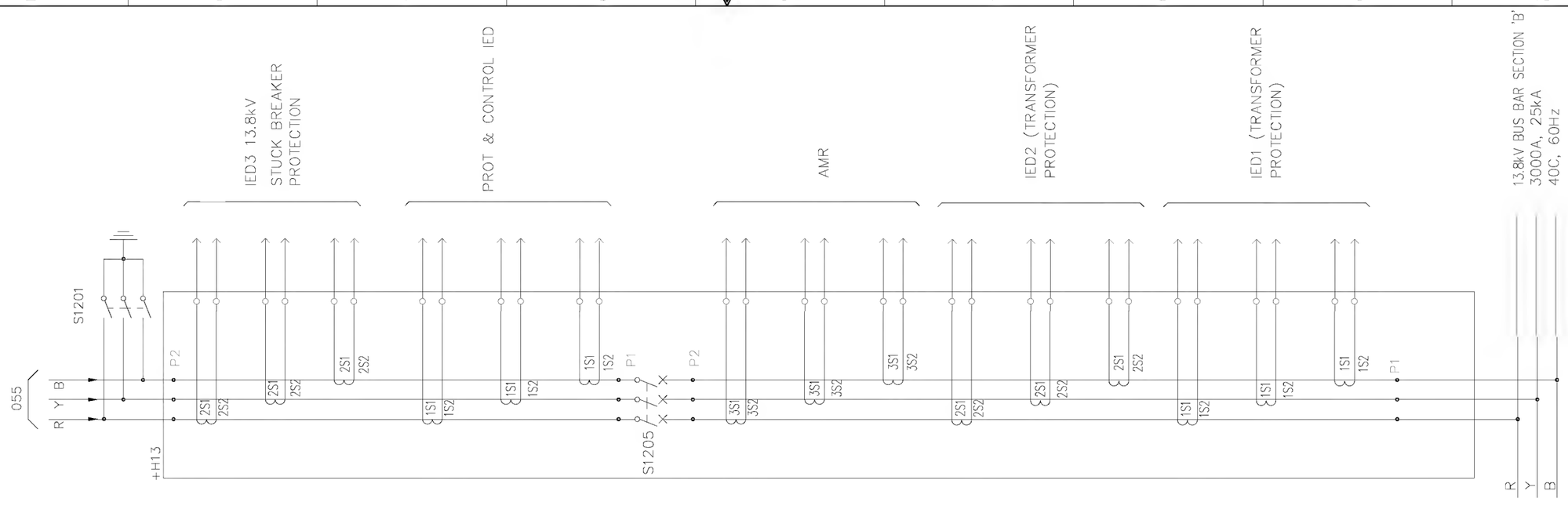
NG/D2-D (2012/01)

DMS VECTOR NGD200



CT	RATIO	CLASS	VK IN VOLTS	IMAG @ VK IN mA	RCT IN (OHMS)	BURDEN IN VA	FUNCTION
T1-1	3000/1A	5P20	–	<25	<10	30	PROTECTION & CONTROL IED
T1-2	3000/1A	10P10	–	<25	<10	30	IED3 (13.8kV STUCK BKR PROTECTION)
T2-1	3000/1A	X	765	<25	<10	–	IED1 (TRANSFORMER PROTECTION)
T2-2	3000/1A	X	765	<25	<10	–	IED2 (TRANSFORMER PROTECTION)
T2-3	3000/1A	0.2Fs5	–	–	–	15	AMR

REV. NO.	DATE	DESCRIPTION
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AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

PRIMARY SYSTEM (GT-2)

132/13.8KV GT-2 RELAY PANEL-1/2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

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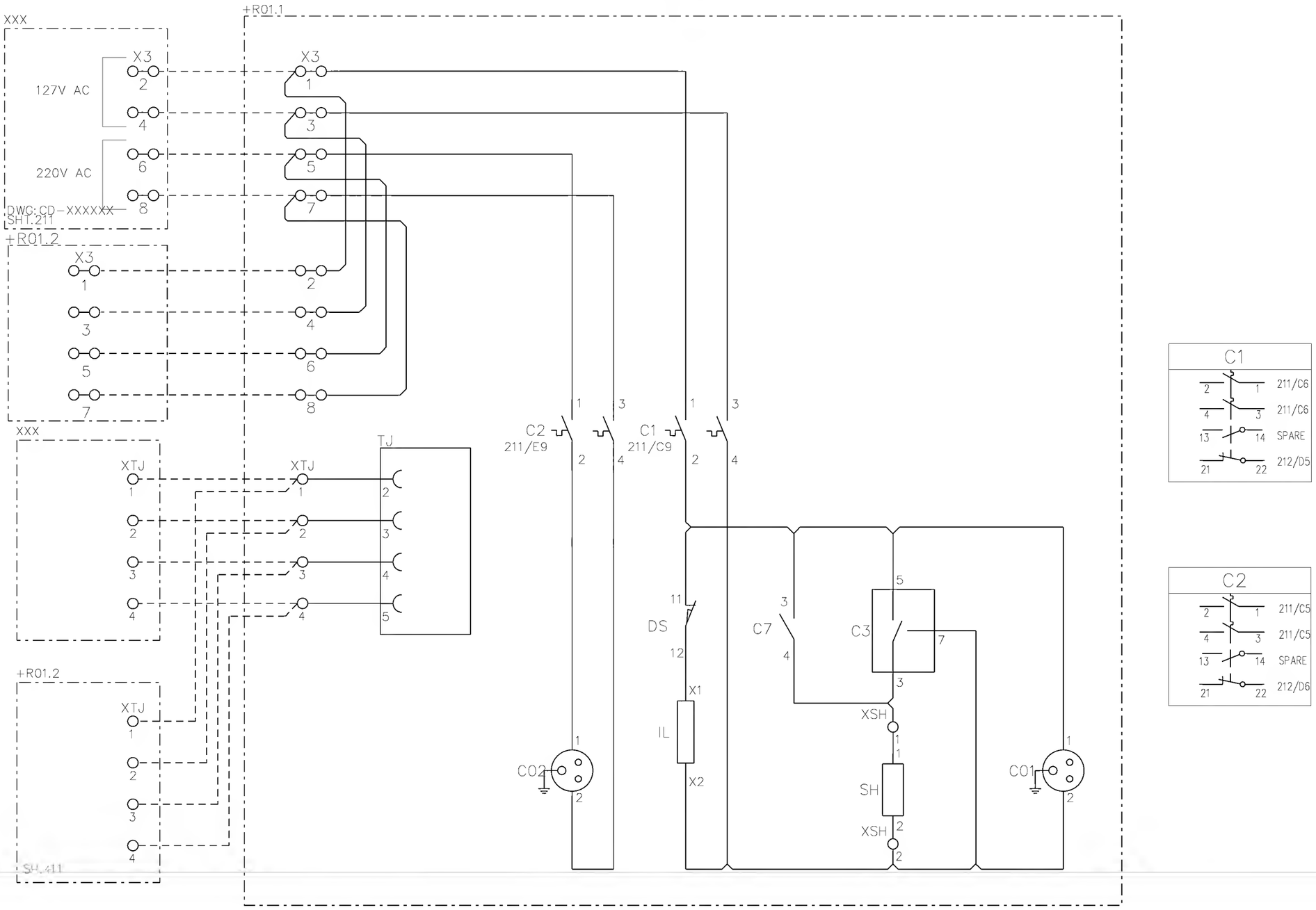

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

AC SUPPLY FOR ILLUMINATION & POWER SOCKET
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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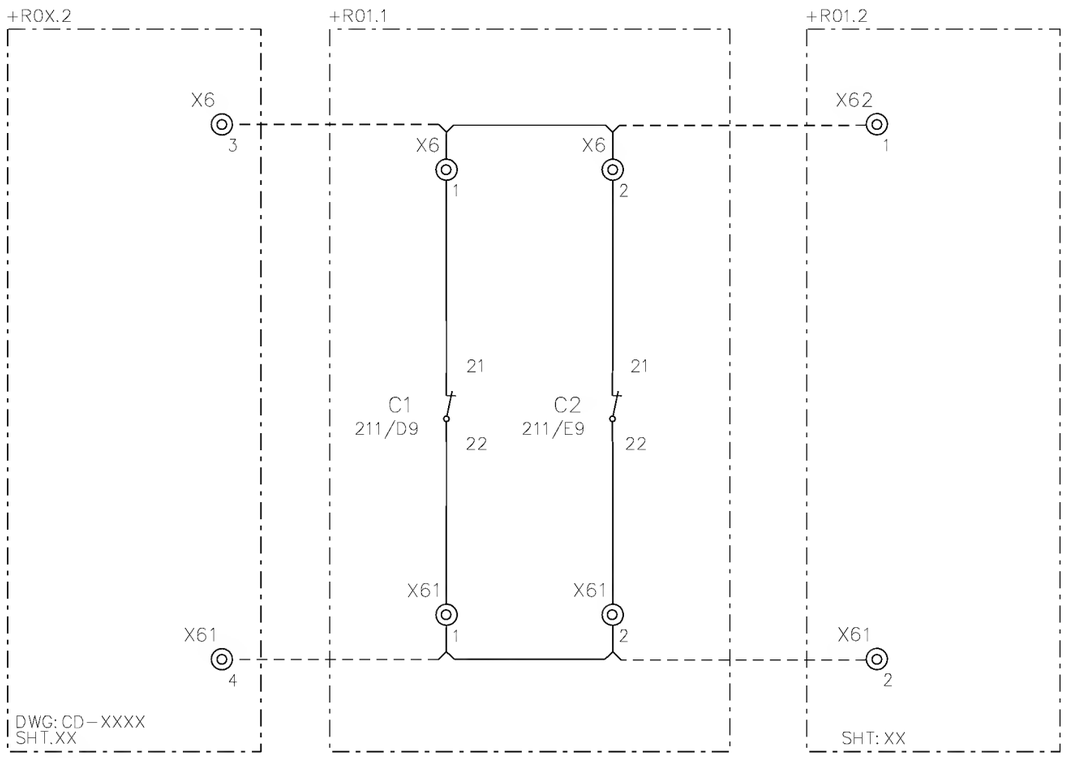

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CUB.LIGHTING,HEATER&SOKET ALARM CKT.	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
			132/13.8kV GT-2 RELAY PANEL-1 +R01.1		
01 / 13 49 / FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY JKR	S/S 8709-132/13.8KV IN AL-KHARJ CITY	INDEX / PLANT NO. / DRAWING NUMBER	SHEET NO. SHT / CONT. / REV. NO.
00 / 13 04 / FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED _____	RIYADH SAUDI ARABIA	- / C421 / CD-322931	212 / 216 / 01
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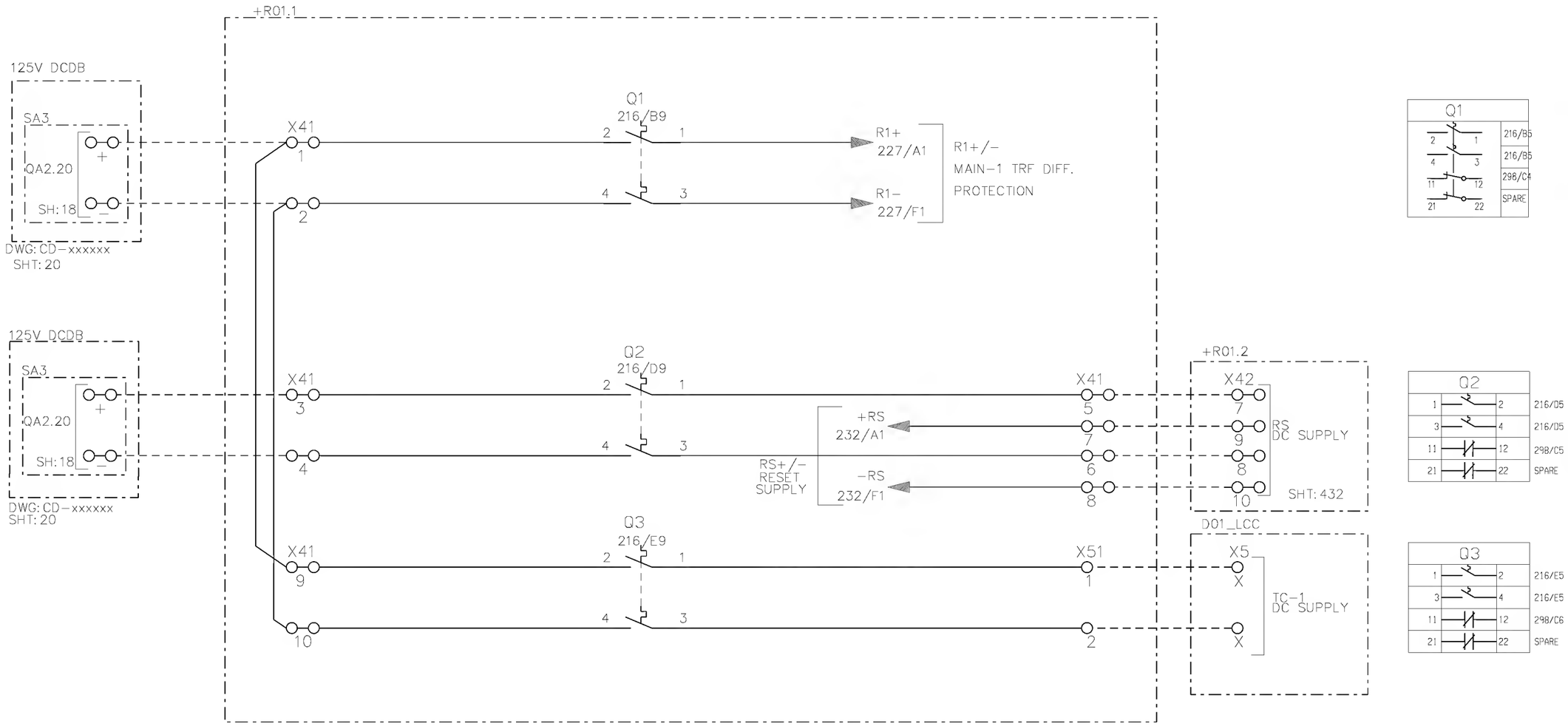

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

DC SUPPLY DISTRIBUTION

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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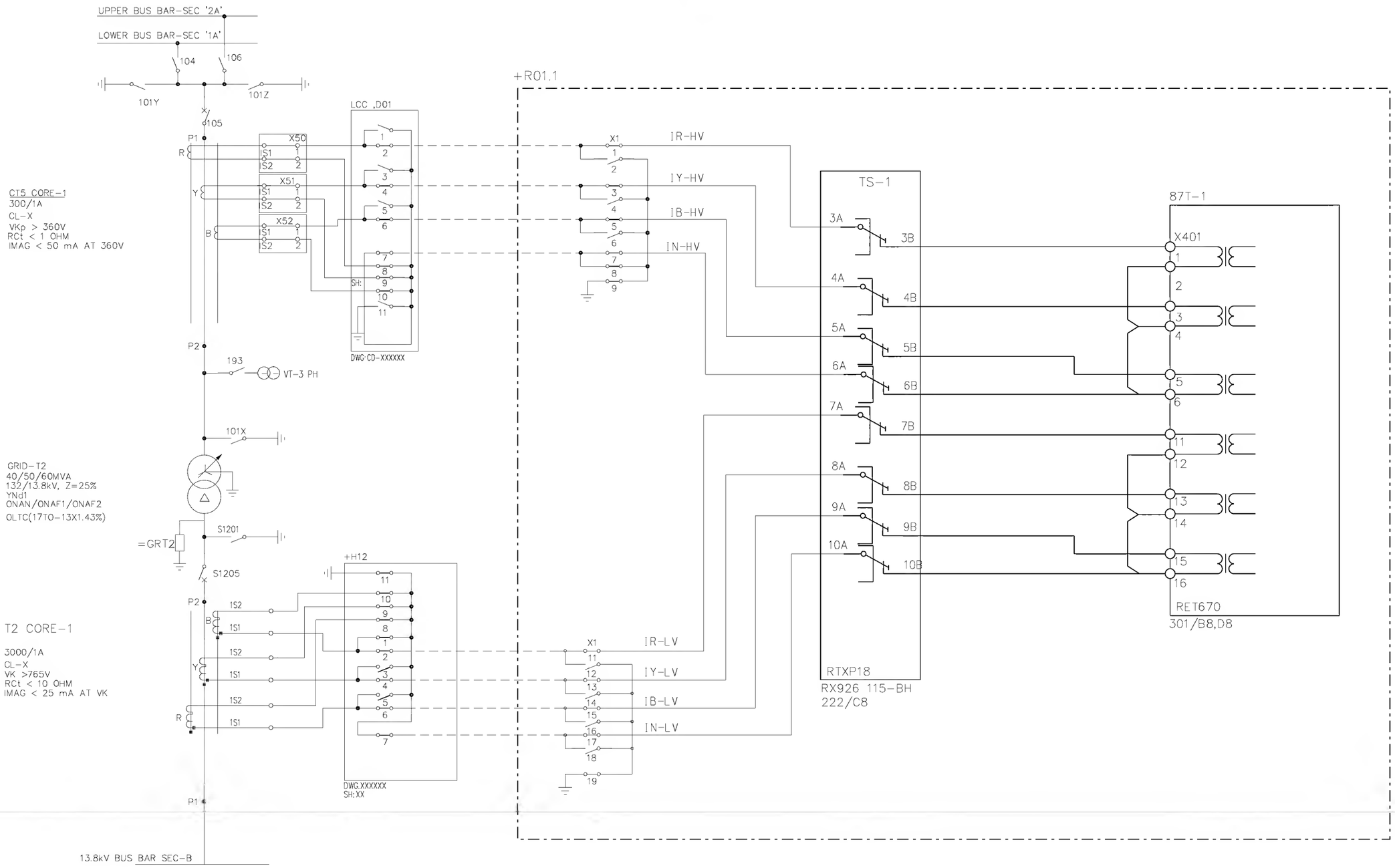

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CT CIRCUITS 87T-1 RELAY	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
01 / 13 49 / FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY JKR	132/13.8kV GT-2 RELAY PANEL-1 +R01.1		
00 / 13 04 / FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED	S/S 8709-132/13.8KV IN AL-KHARJ CITY		
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA		

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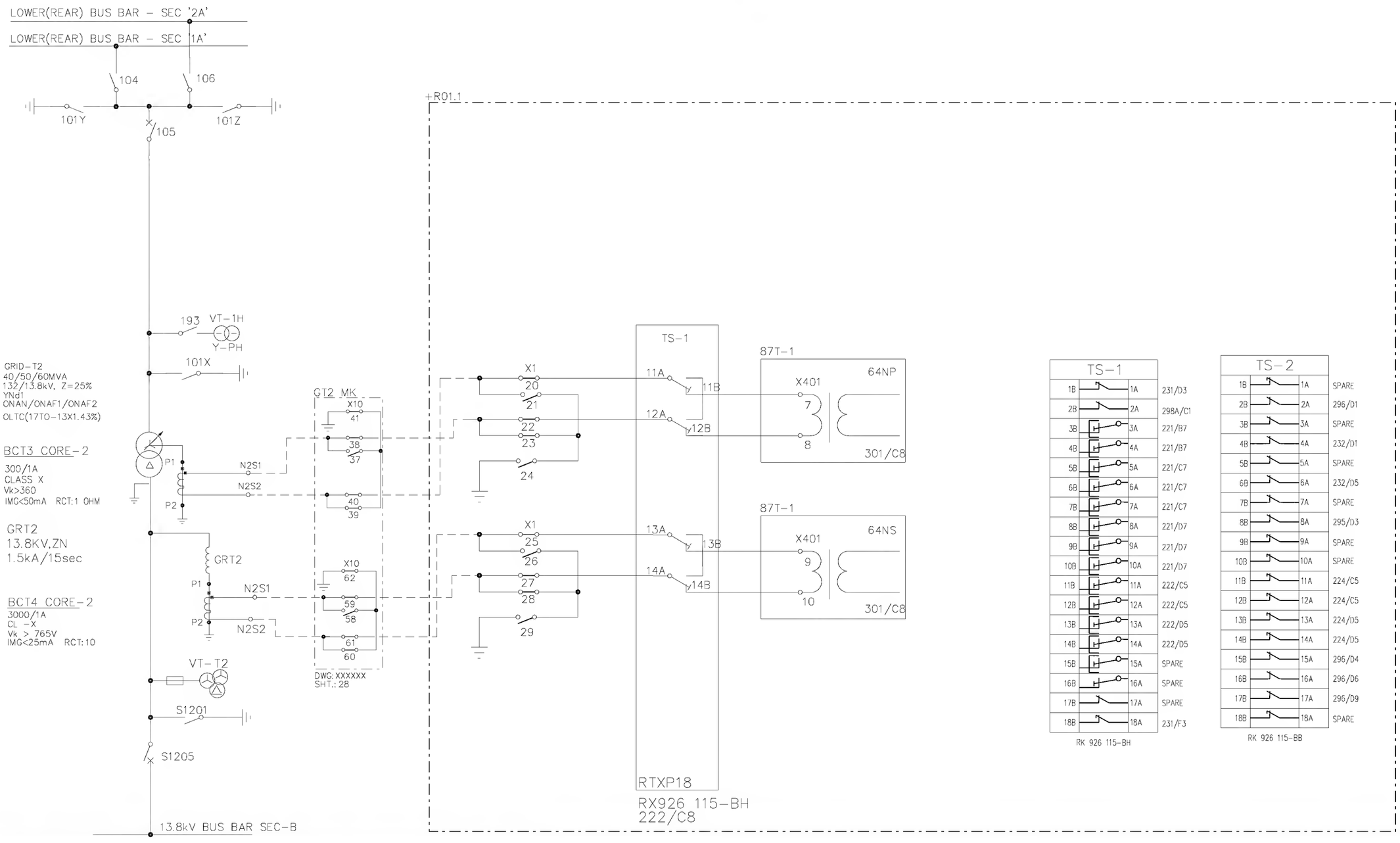

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CT CIRCUITS 87T-1 RELAY	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
01 / 13 49 / FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY JKR	132/13.8kV GT-2 RELAY PANEL-1 +R01.1		
00 / 13 04 / FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED	S/S 8709-132/13.8KV IN AL-KHARJ CITY		
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA		

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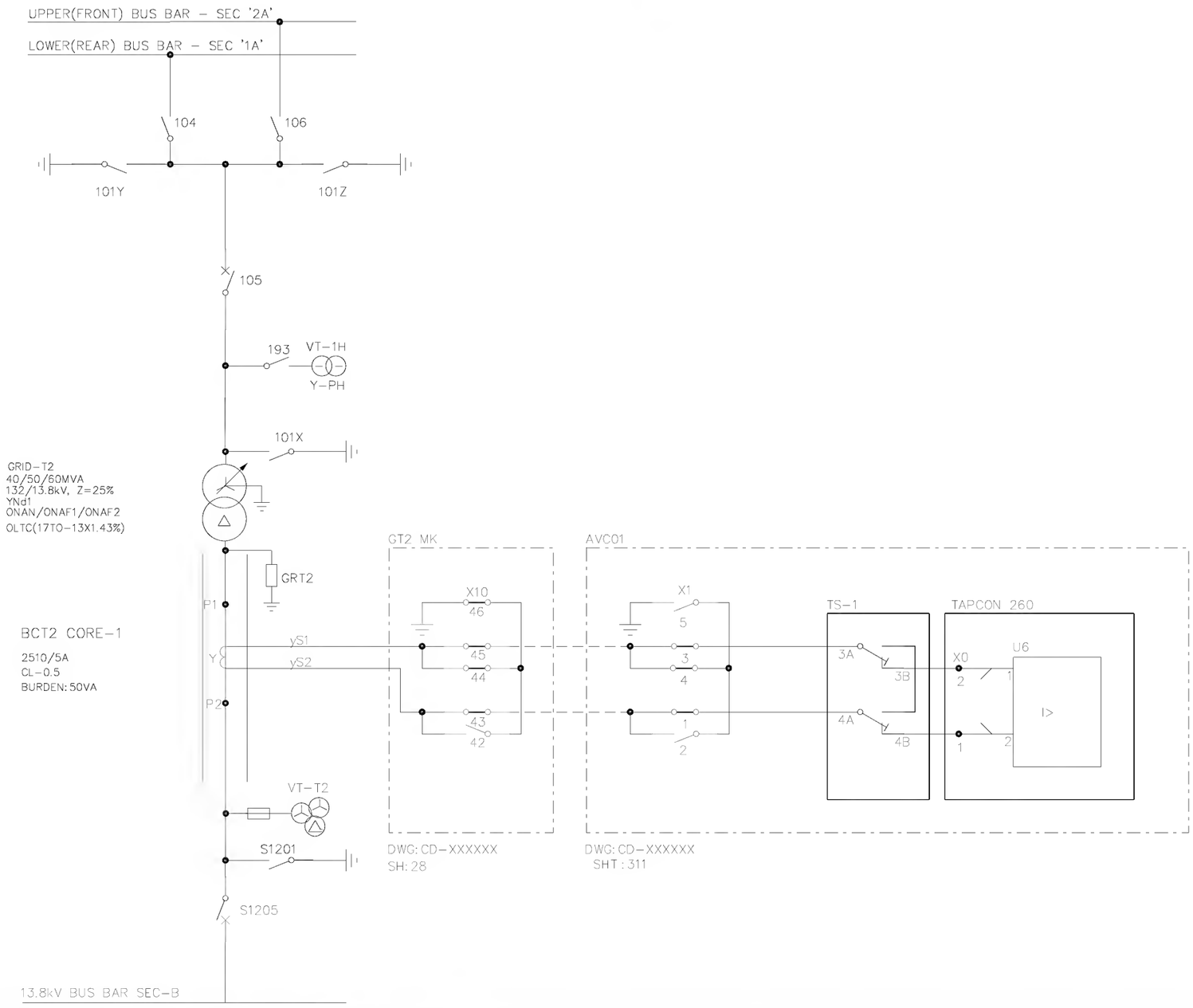
DMS VECTOR NGD200



AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CT CIRCUITS 87T-1 RELAY	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
		DRAWN BY RIZ CHECKED BY JKR	132/13.8kV GT-2 RELAY PANEL-1 +R01.1		
01 / 13 49 / FACTORY ASBUILT		DATE STARTED 24.01.2013 DATE COMPLETED _____	S/S 8709-132/13.8KV IN AL-KHARJ CITY		
00 / 13 04 / FOR APPROVAL		OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA		

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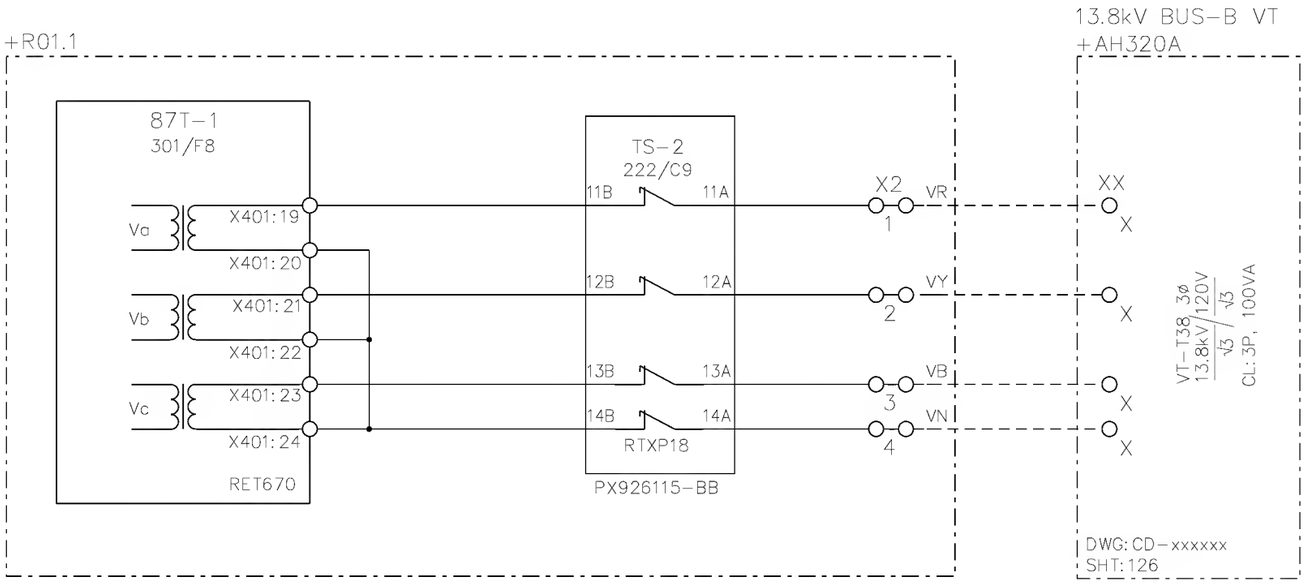

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DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

VT CIRCUITS 87T-1 RELAY
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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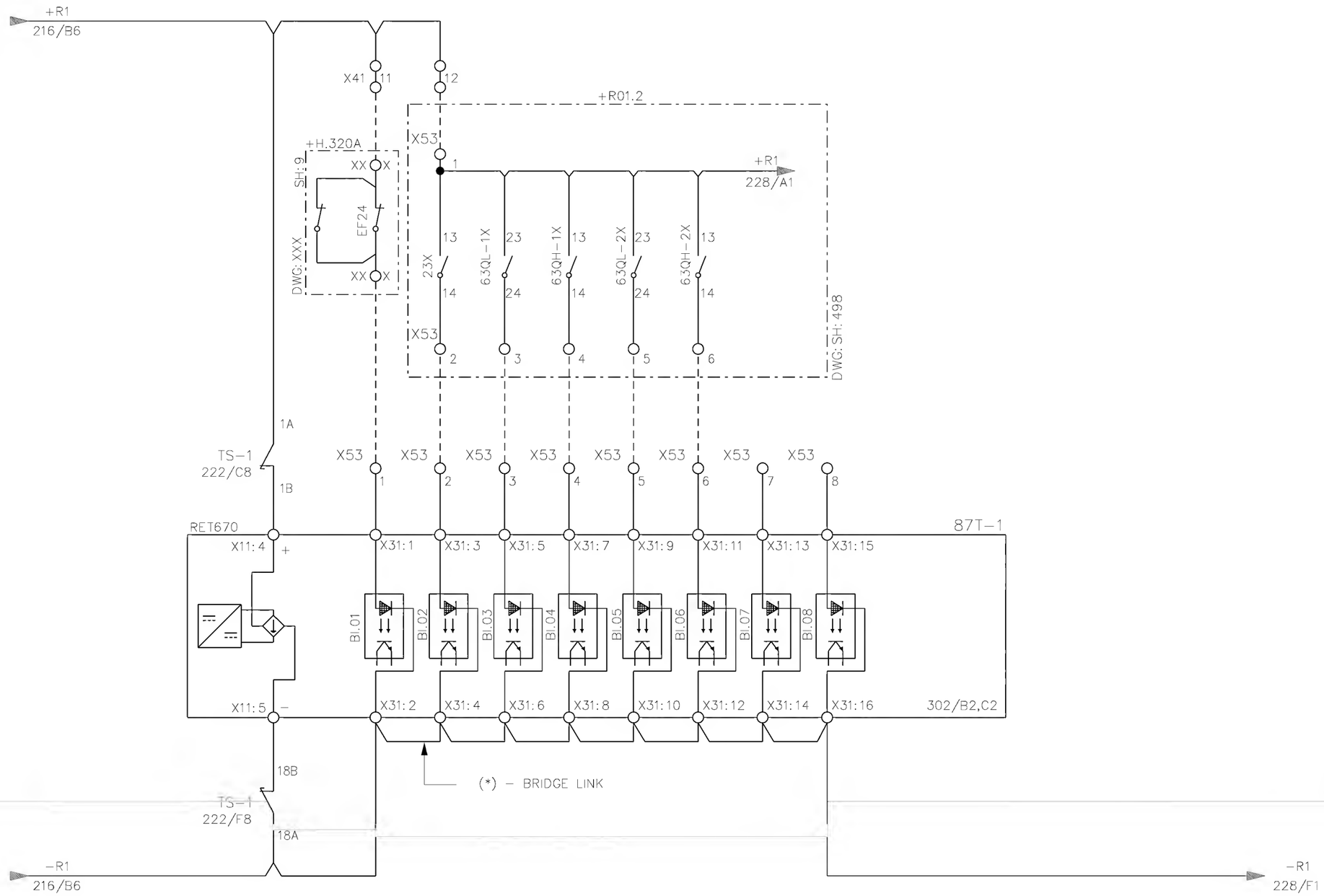
	VT	TR COOLER	MAIN TANK	MAIN TANK	OLTC OIL	OLTC OIL	
87T-1	MCB	FAIL	OIL LEVEL	OIL LEVEL	LEVEL LOW	LEVELHIGH	
PSU	FAIL	ALARM	LOW ALARM	HIGH ALARM	ALARM	ALARM	



01	13 49	FACTORY ASBUILT
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AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00

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DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87T-1 BINARY INPUTS

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

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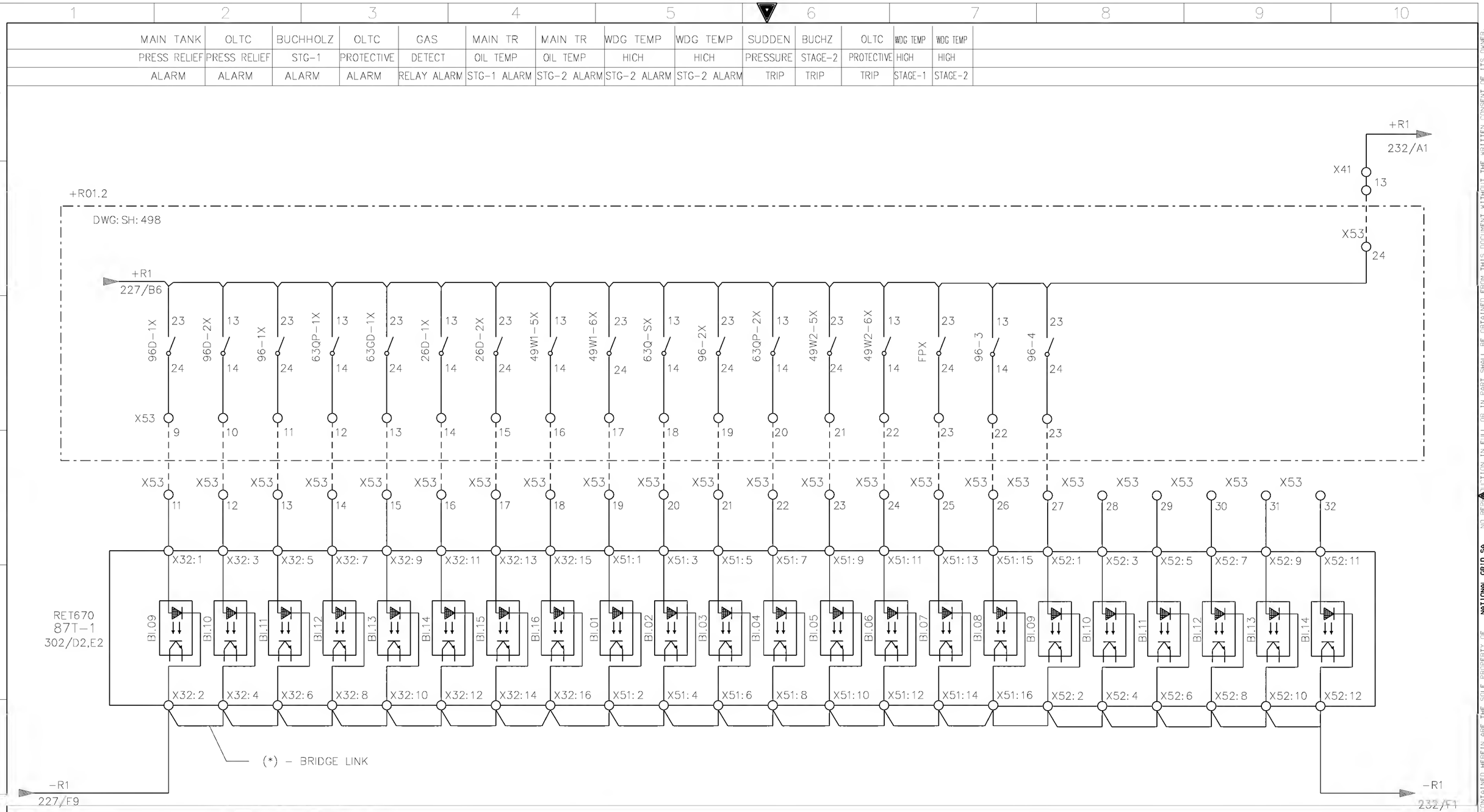

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87T-1 BINARY INPUTS
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

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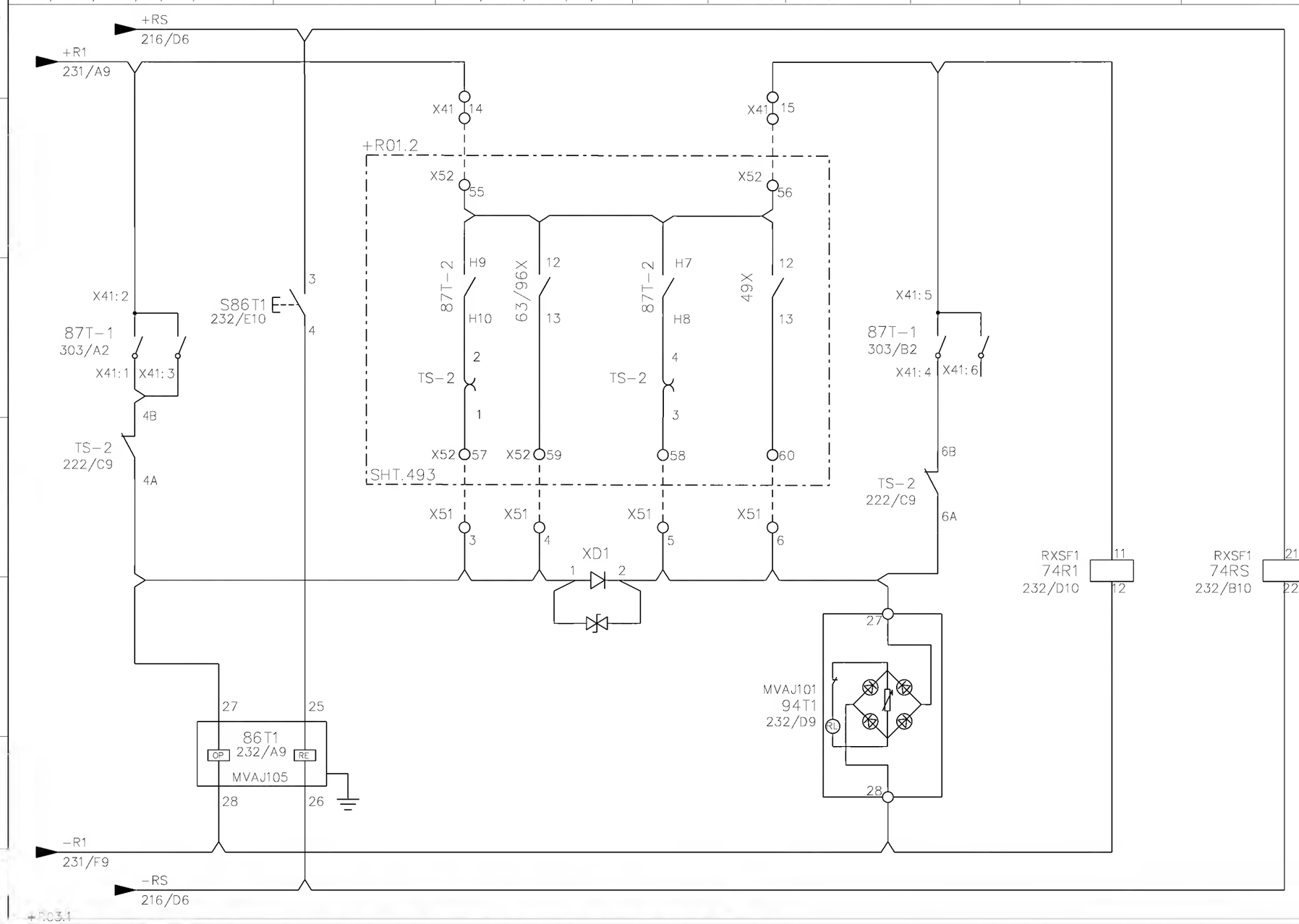
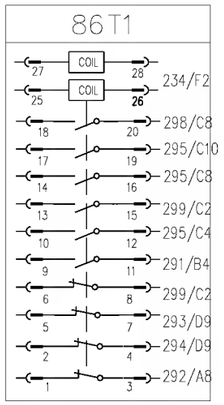
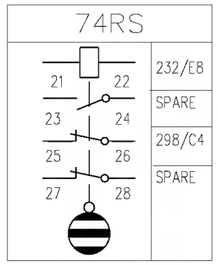
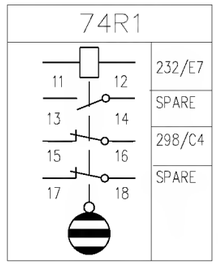
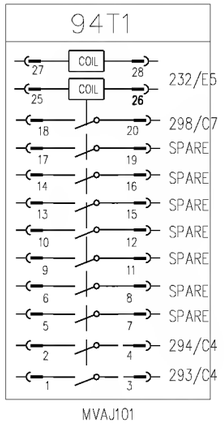
TRANSF. DIFF. MAIN-1 PROTN. TRIP – 86T1		MAIN-2 PROTN. TRIP – 86T1		TRANSFORMER MECH. PROTN						
TRANSF. DIFFL. PROTN.	TRIP RELAY	TRANSF. DIFFL. PROTN.	51/51N	49W1-5X	63QSX	63QR2X	TRIP	R1± DC SUPVN.	RS± DC SUPVN.	
87T1/64NP/64NS/50/51P/51N SBEF	RESET	87T2/64NP/64NS/50/51P	SBEF	49W2-6X	49W2-5A		51/51NS	SUPPLY	SUPPLY	

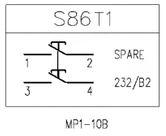












AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

MAIN-1 TRANSF DIFFL PROT TRIP RELAY CIRCUIT
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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-	C421	CD-322931	232	276	01

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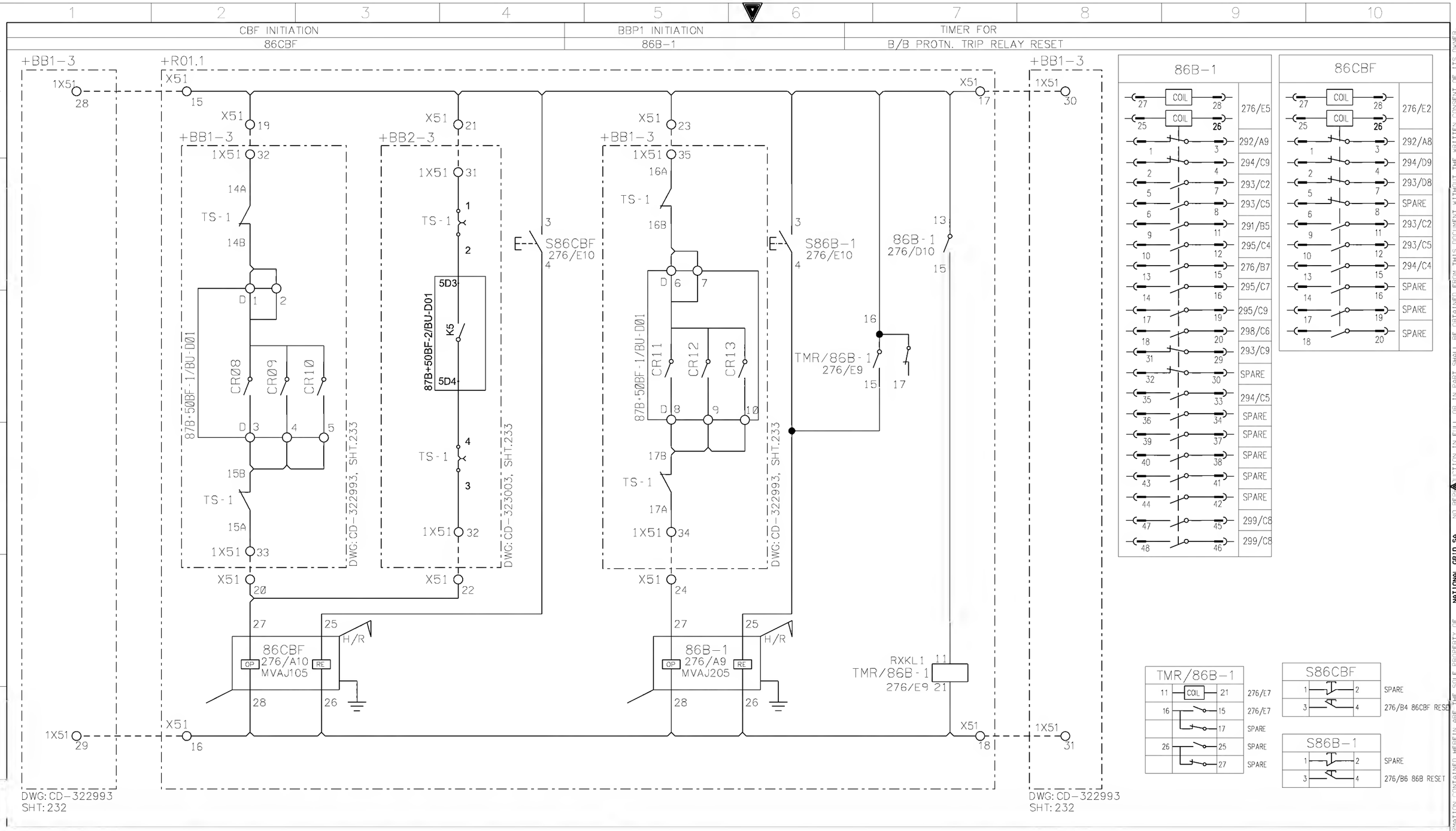

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CBF-1/2 & BUSBAR PROTN-1 TRIP RELAY CIRCUIT
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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NG/D2-Q (2012/01)
DMS VECTOR NGD200

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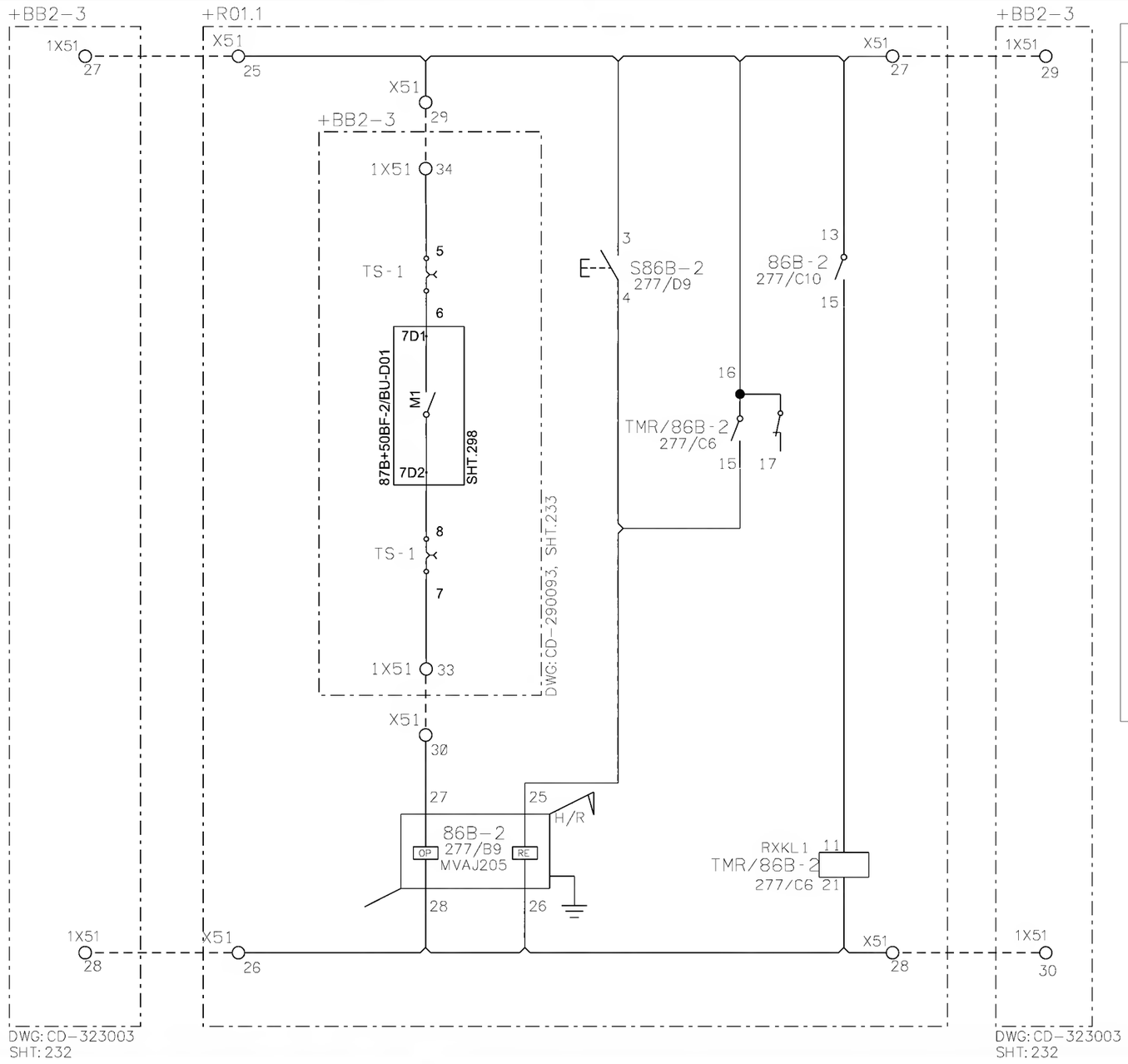
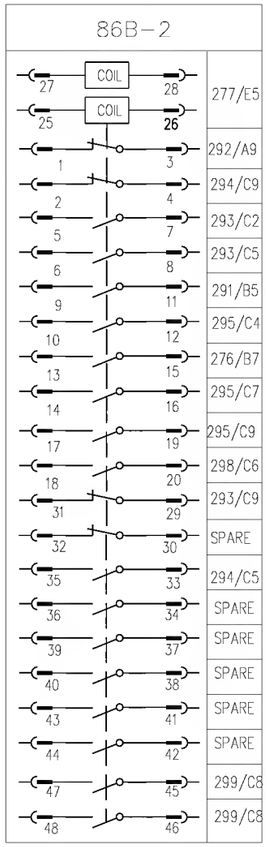
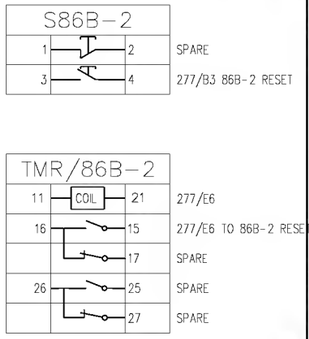
BBP2 INITIATION
86B-2

TIMER FOR
B/B PROTN. TRIP RELAY RESET







AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	BUSBAR PROTN-2 TRIP RELAY CIRCUIT	الشركة الوطنية لنقل الكهرباء — نقل الكهرباء National Grid SA
01 13 49 FACTORY ASBUILT	DRAWN BY RIZ CHECKED BY JKR		132/13.8kV GT-2 RELAY PANEL-1 +R01.1	
00 13 04 FOR APPROVAL	DATE STARTED 24.01.2013 DATE COMPLETED _____		S/S 8709-132/13.8KV IN AL-KHARJ CITY	
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC		RIYADH SAUDI ARABIA	

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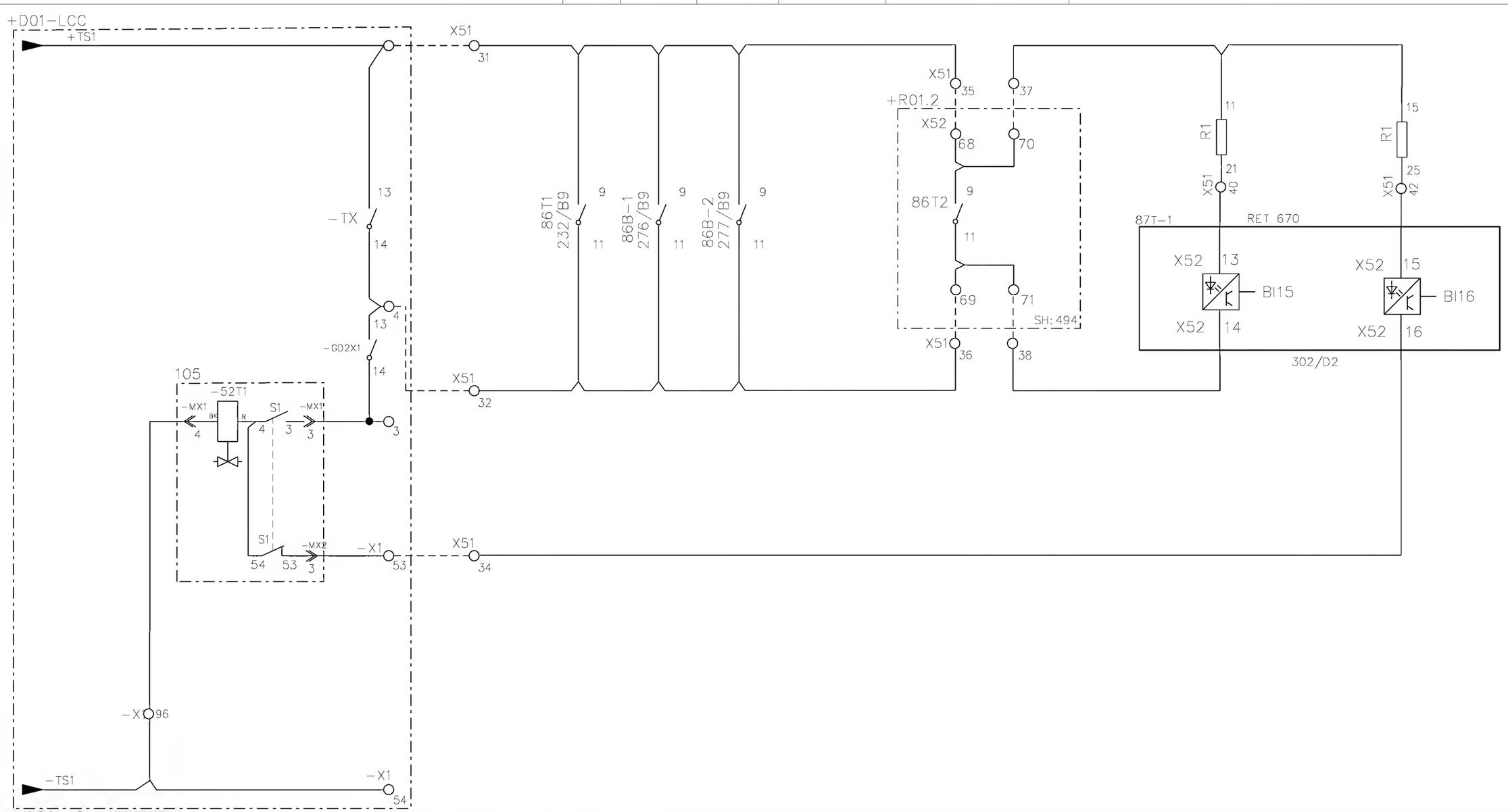
NG/D2-D (2012/01)

DMS VECTOR NGD200

TRIP CIRCUIT-1 SUPVN.

PROTN TRIP				PROTN TRIP	SUPERVISION RELAY
86T1	86B-1	86B-2		86T2	27TC1



+R01.1

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TRIP COIL-1 SUPERVSION CIRCUIT
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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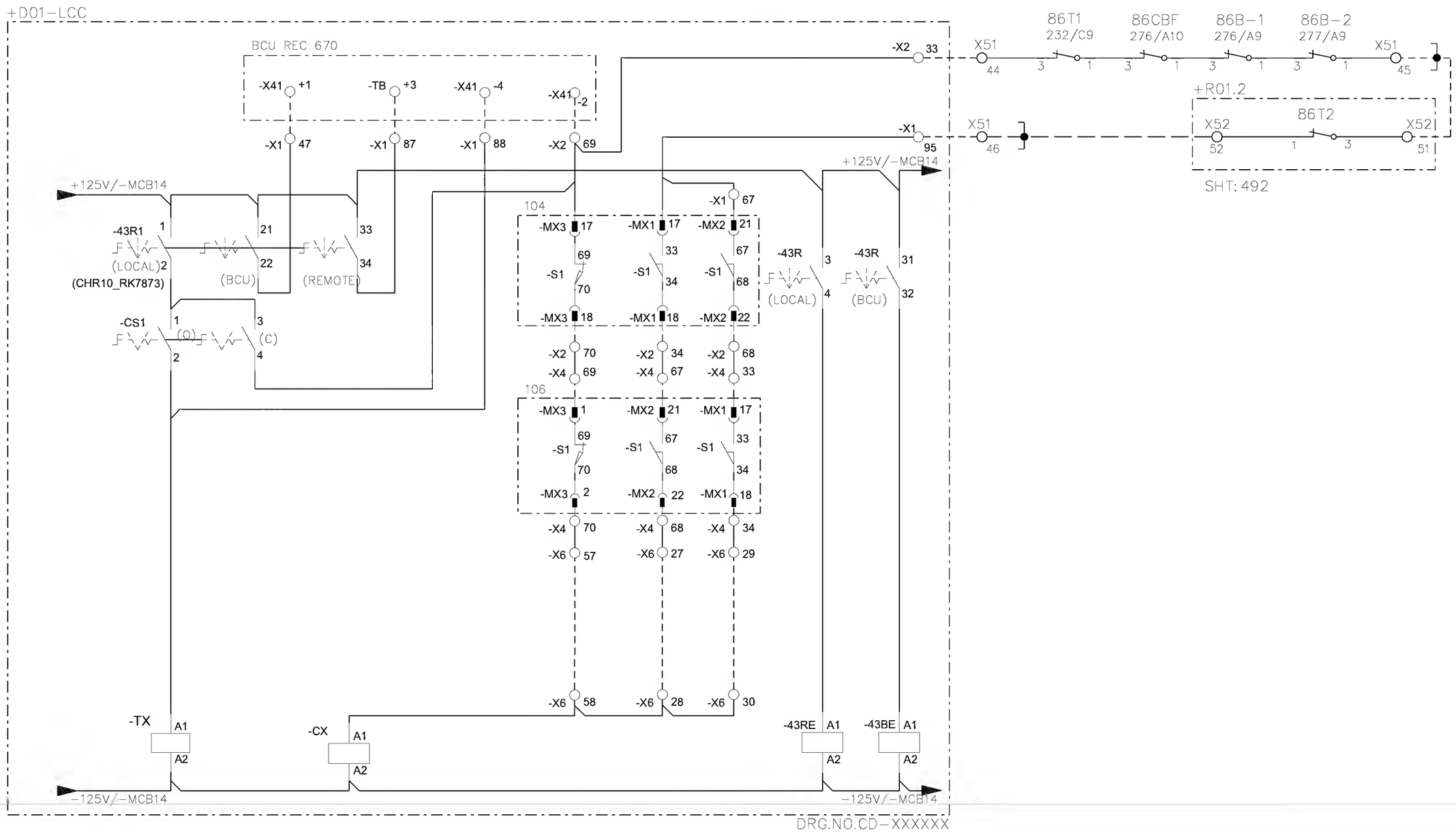

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CB K305 CLOSE BLOCK CIRCUIT

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
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NG/D2-D (2012/01)

DMS VECTOR NGD200

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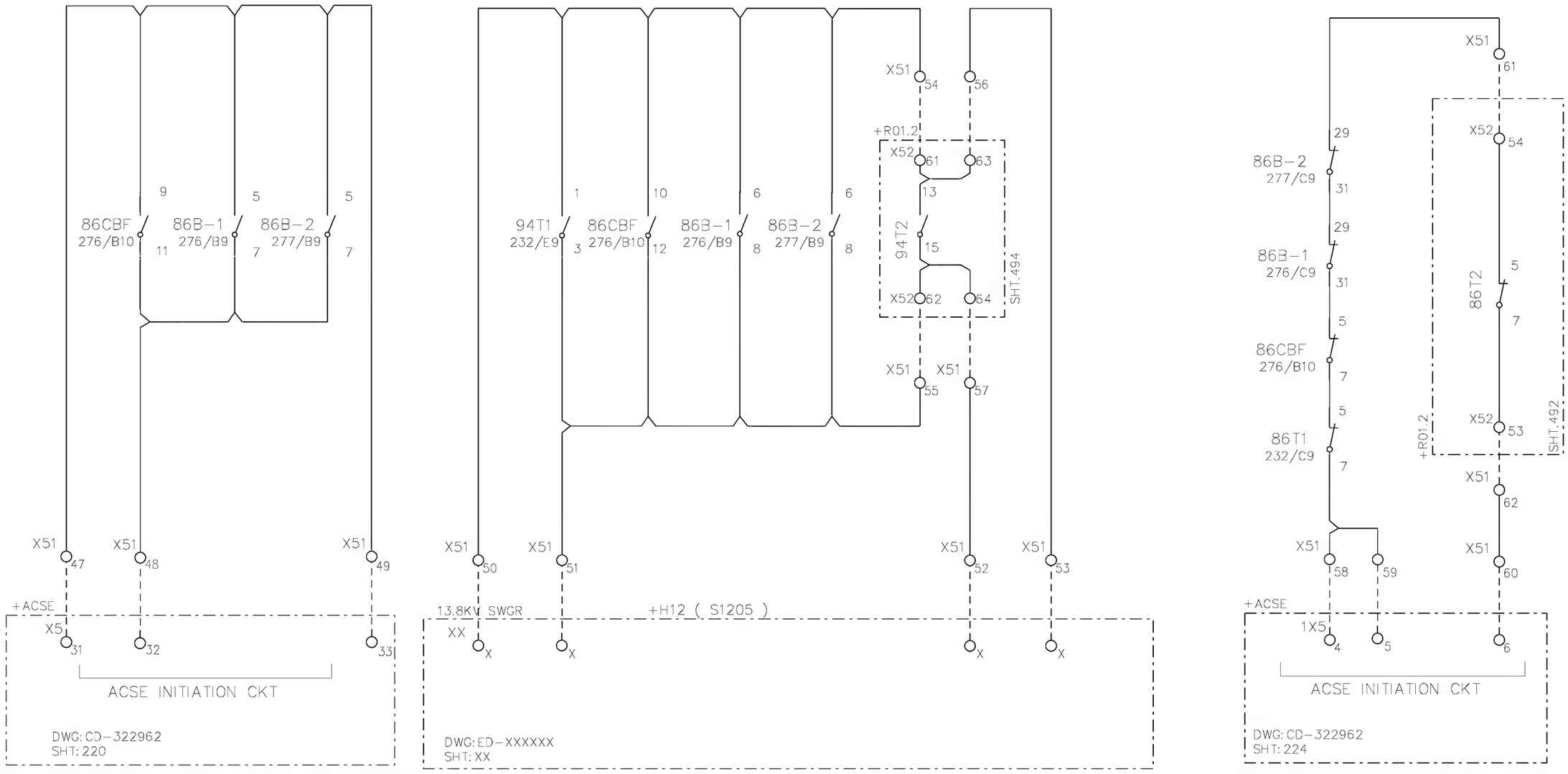
ACSE TRIP RELAY				TRANS. LV TRIP RELAY	CBF PROTN. TRIP RELAY	BUS BAR PROTN. TRIP RELAY	TRANS. LV TRIP RELAY		ACSE BLOCK	
86CBF	86B-1	86B-2		94T1	86CBF	86B-1,86B-2	94T2		86T1,86B-1,86B-2,86CBF,86T2	



AS-BUILT BY ____ DATE ____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED ____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CONTACTS FOR ACSE INITIATION & LV TRIPPING TC
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
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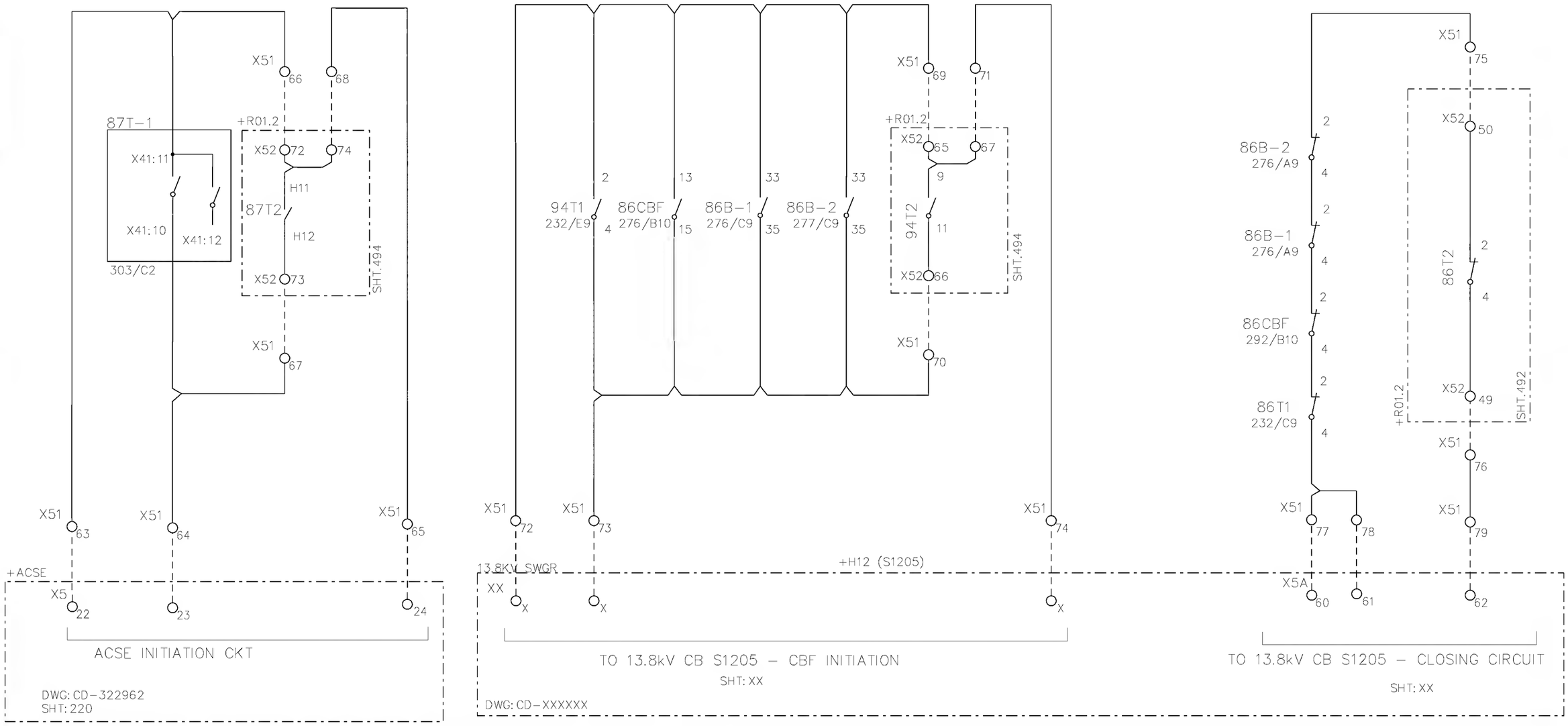
ACSE INITIATION CKT		TRANS. LV	CBF	BUS BAR	TRANS. LV	LV CB
		TRIP RELAY	PROTN. TRIP RELAY	PROTN. TRIP RELAY	TRIP RELAY	CLOSE BLOCK
87T-1	87T-2	94T1	86CBF	86B-1,86B-2	94T2	86T1,86B-1,86B-2,86CBF,86T2



AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

ACSE INI & LV CLOSE BLK CIRCUIT

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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NG/D2-D (2012/01)

DMS VECTOR NGD200

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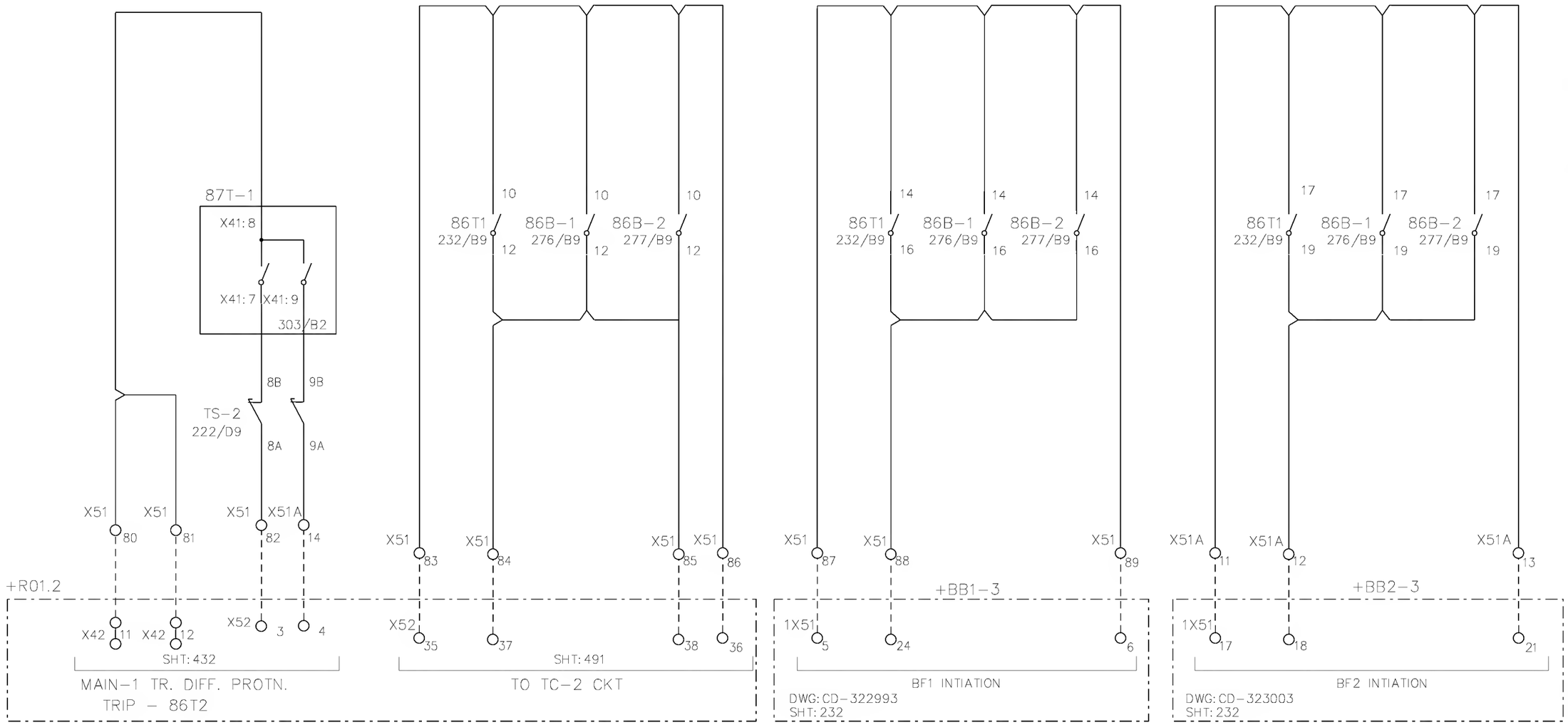
MAIN-1 TR. DIFF. PROTN. TRIP – 86T2	TO TC-2 CKT	BF1 INTIATION	BF2 INTIATION



REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CONTACTS FOR TRIP CIRCUIT-2 & BFI½

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

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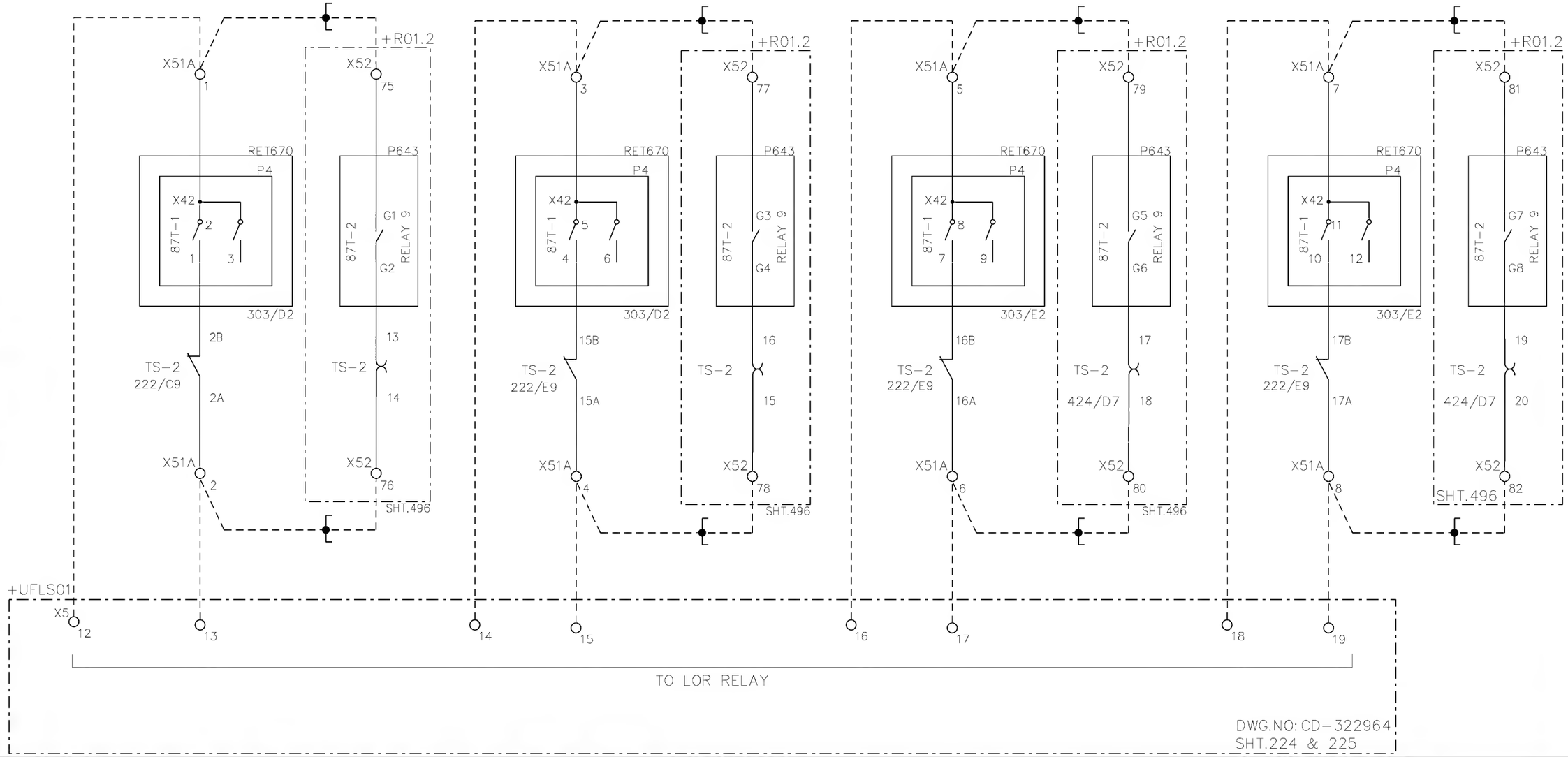

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CONTACTS FOR U/F LOAD SHEDDING	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
01 13 49 FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY JKR	132/13.8kV GT-2 RELAY PANEL-1 +R01.1		
00 13 04 FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED _____	S/S 8709-132/13.8KV IN AL-KHARJ CITY		
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA		

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
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NG/D2-D (2012/01)

DMS VECTOR NGD200

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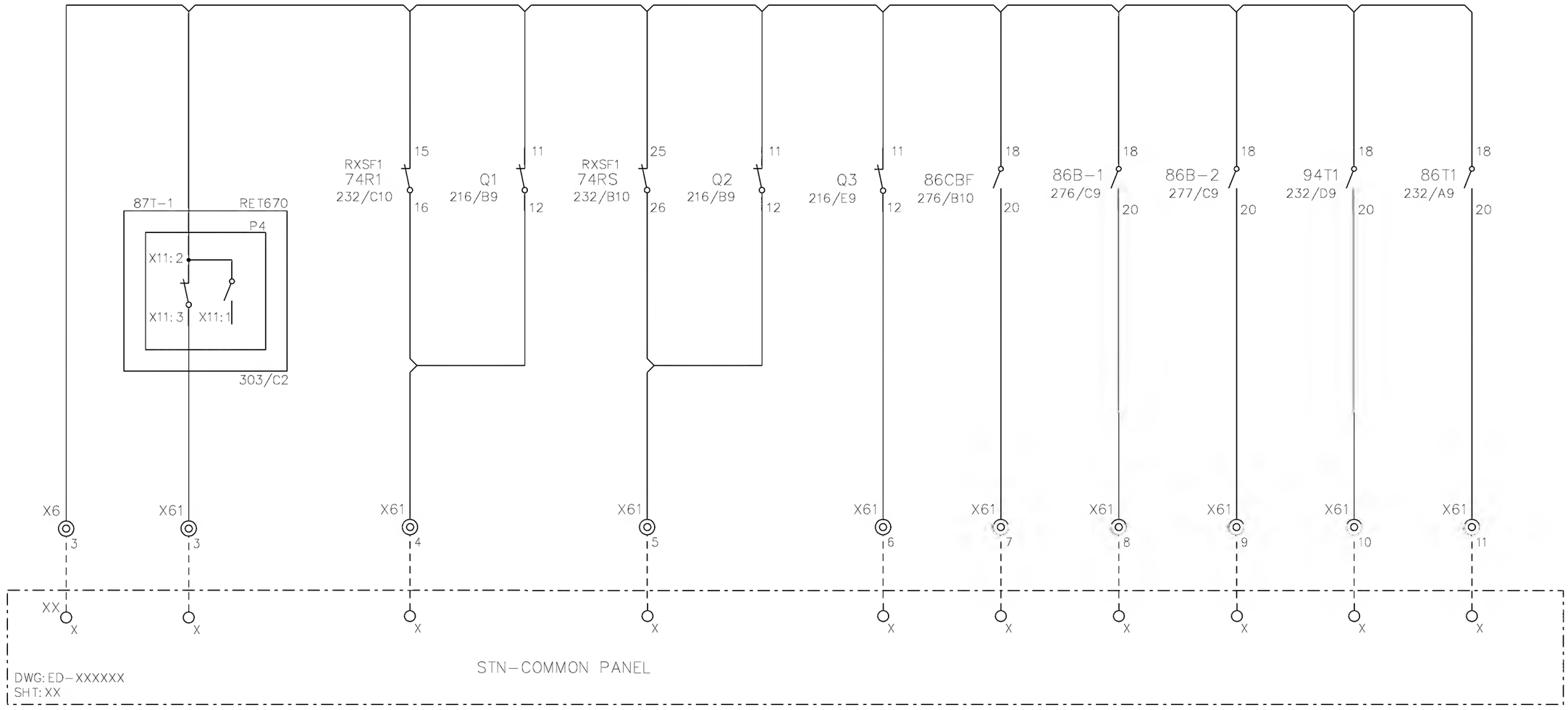
TRANSF.									
DIFF. PROTN.	R1 DC SUPPLY	RS DC SUPPLY	TC1	86CBF	86B-1	86B-2	94T1	86T1	
MAIN-1 FAULTY	FAILED	FAILED	FAILED	OPTD	OPTD	OPTD	OPTD	OPTD	



AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	STN-COMMON ALARM CIRCUIT	الشركة الوطنية لنقل الكهرباء — نقل الكهرباء National Grid SA
			132/13.8kV GT-2 RELAY PANEL-1 +R01.1	
01 13 49 FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY JKR	S/S 8709-132/13.8KV IN AL-KHARJ CITY	
00 13 04 FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED _____	RIYADH SAUDI ARABIA	
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC		

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
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NG/D2-D (2012/01)

DMS VECTOR NGD200

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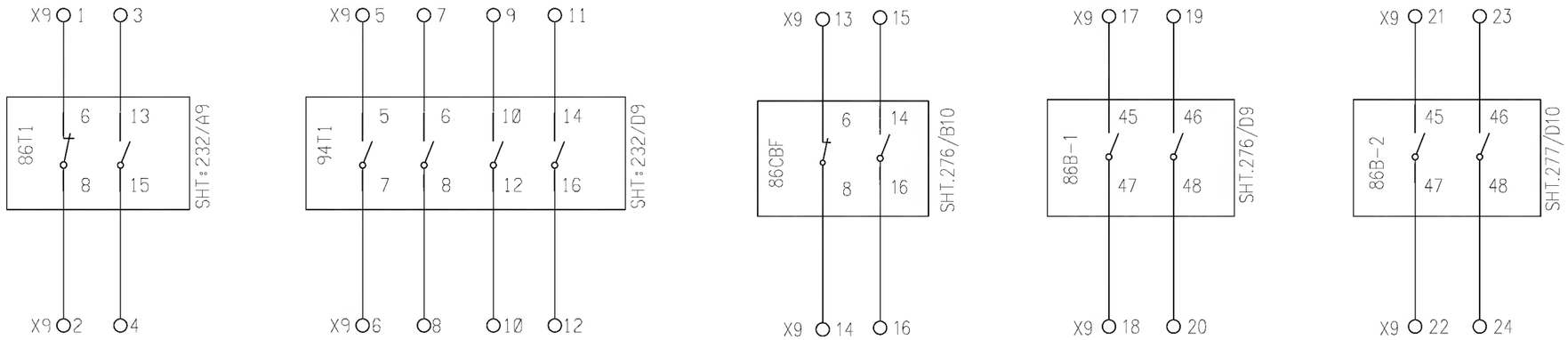
SPARE CONTACTS



AS-BUILT BY ____ DATE ____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED ____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

LOR SPARE CONTACTS
132/13.8kV GT-2 RELAY PANEL-1 +R01.1
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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DMS VECTOR NGD200

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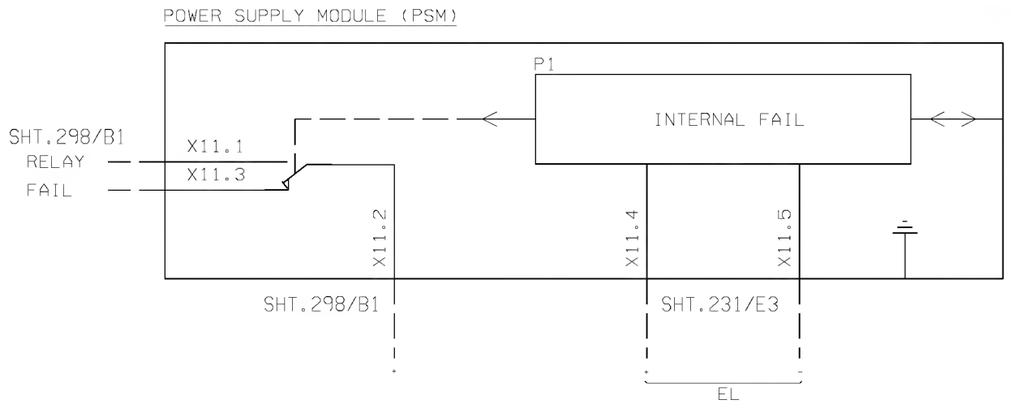
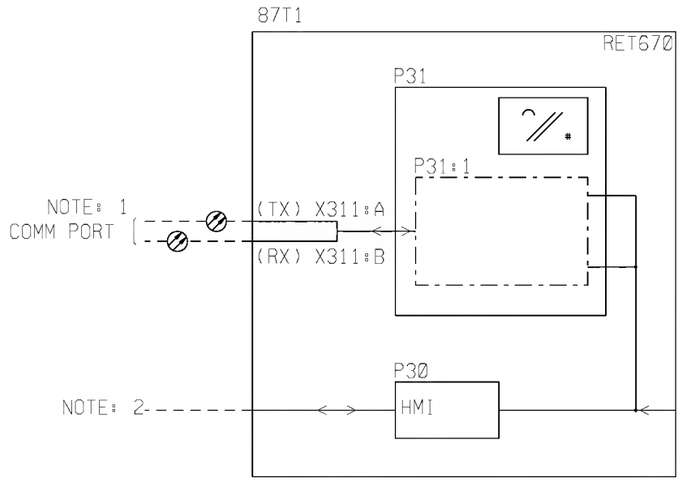
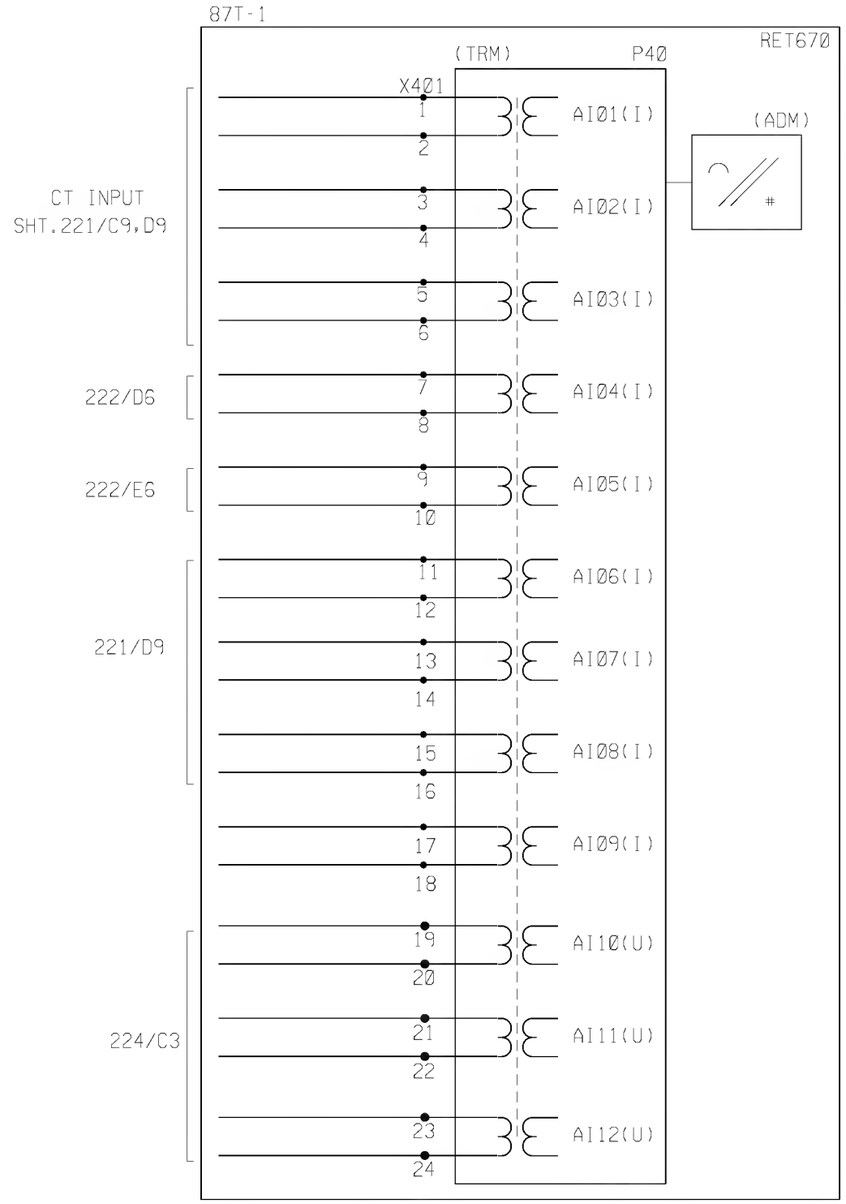
87T-1







ABBREVIATIONS

TRM	TRANSFORMER INPUT MODULE
ADM	A/D CONVERSION MODULE
PSM	POWER SYPPLY MODULE
IOM	BINARY IN/OUT MODULE
BOM	BINARY OUTPUT MODULE
HMI	HUMAN MACHINE INTERFACE
BIM	BINARY INPUT MODULE

USED FOR TRIP ISOLATION (RTXP-24)

USED FOR VOLTAGE (RTXP-24)

USED FOR CT ISOLATION (RTXP-24)

NOTE:

1. OPTICAL ETHERNET MODULE 2 GLASS INTERFACES - IEC 61850
2. FRONT COMMUNICATION PORT, ETHERNET, RJ45 CONNECTORL

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
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AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

BLOCK REFERENCE

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

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DMS VECTOR NGD200

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BINARY INPUT CARD

87T-1

BIM P3
RET670

LOCATION=P3

SHT.227/E3

SHT.228/E4

		PLANT ADAPTED CONFIGURATION
X31 1	BI.01	VT MCB FAIL
X31 2		
X31 3	BI.02	SPARE
X31 4		
X31 5	BI.03	SPARE
X31 6		
X31 7	BI.04	SPARE
X31 8		
X31 9	BI.05	SPARE
X31 10		
X31 11	BI.06	SPARE
X31 12		
X31 13	BI.07	CBF1 INITIATION
X31 14		
X31 15	BI.08	SPARE
X31 16		
X32 1	BI.09	SPARE
X32 2		
X32 3	BI.10	SPARE
X32 4		
X32 5	BI.11	SPARE
X32 6		
X32 7	BI.12	SPARE
X32 8		
X32 9	BI.13	SPARE
X32 10		
X32 11	BI.14	SPARE
X32 12		
X32 13	BI.15	SPARE
X32 14		
X32 15	BI.16	SPARE
X32 16		

BINARY INPUT CARD

87T-1

BIM P5
RET670

LOCATION=P6

SHT.228/E8

SHT.291/C9,C10

		PLANT ADAPTED CONFIGURATION
X51 1	BI.01	SPARE
X51 2		
X51 3	BI.02	SPARE
X51 4		
X51 5	BI.03	SPARE
X51 6		
X51 7	BI.04	SPARE
X51 8		
X51 9	BI.05	SPARE
X51 10		
X51 11	BI.06	SPARE
X51 12		
X51 13	BI.07	SPARE
X51 14		
X51 15	BI.08	SPARE
X51 16		
X52 1	BI.09	SPARE
X52 2		
X52 3	BI.10	SPARE
X52 4		
X52 5	BI.11	SPARE
X52 6		
X52 7	BI.12	SPARE
X52 8		
X52 9	BI.13	SPARE
X52 10		
X52 11	BI.14	SPARE
X52 12		
X52 13	BI.15	SPARE
X52 14		
X52 15	BI.16	SPARE
X52 16		

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AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

BLOCK REFERENCE

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

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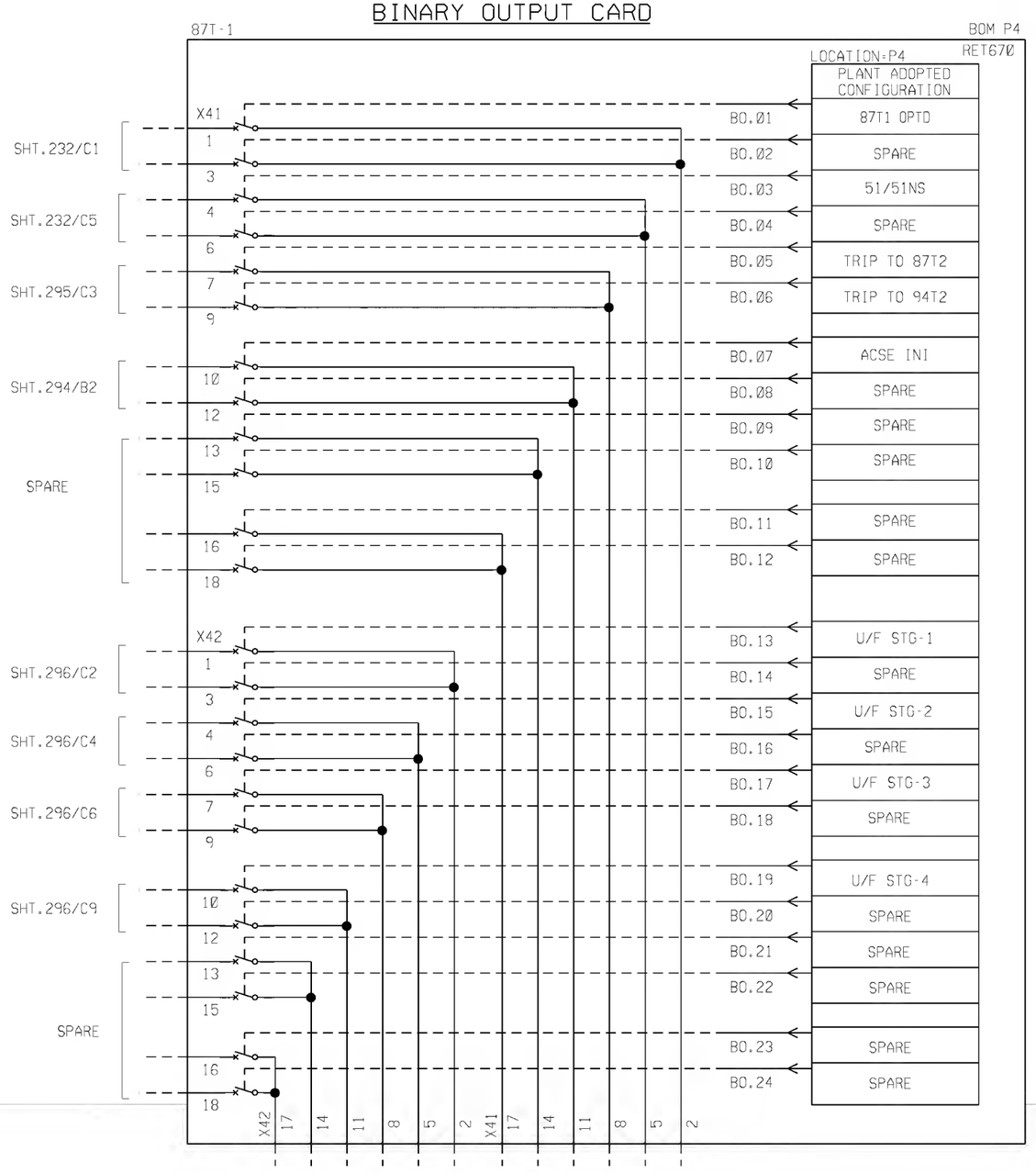
NG/D2-D (2012/01)

DMS VECTOR NGD200

BINARY OUTPUT CARD



REV. NO.	DATE	DESCRIPTION
01		FACTORY ASBUILT
00	13 04	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPC ENG. DEPT. AUT-PSAC

BLOCK REFERENCE

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	303	304	01

NG/D2-D (2012/01)

DMS VECTOR NGD200

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REFERENCE	X1 CT CKTS.	
221/A5	1	1
221/B5	2	2
221/B5	3	3
221/B5	4	4
221/B5	5	5
221/B5	6	6
221/B5	7	7
221/B5	8	8
221/B5	9	9
SPARE	10	10
221/E5	11	11
221/E5	12	12
221/E5	13	13
221/E5	14	14
221/E5	15	15
221/F5	16	16
221/F5	17	17
221/F5	18	18
221/F5	19	19
222/C4	20	20
222/C4	21	21
222/D4	22	22
222/D4	23	23
222/D4	24	24
222/D4	25	25
222/E4	26	26
222/E4	27	27
222/E4	28	28
222/E4	29	29
SPARE	30	30
223/E5	31	31
223/E5	32	32
223/D5	33	33
223/D5	34	34
223/D5	35	35
SPARE	36	36
SPARE	37	37
SPARE	38	38
SPARE	39	39
SPARE	40	40
SPARE	41	41
SPARE	42	42
SPARE	43	43
SPARE	44	44
SPARE	45	45
SPARE	46	46
SPARE	47	47
SPARE	48	48
SPARE	49	49
SPARE	50	50

REFERENCE	X2 CT CKTS.	
224/C6	1	1
224/C6	2	2
224/C6	3	3
224/D6	4	4
SPARE	5	5

REFERENCE	X3 AC CKTS.	
211/A3	1	1
211/B3	2	2
211/A3	3	3
211/C3	4	4
211/B3	5	5
211/C3	6	6
211/B3	7	7
211/C3	8	8
SPARE	9	9
SPARE	10	10

REFERENCE	X9 SPARE CKT.	
299/B2	1	1
299/D2	2	2
299/B3	3	3
299/D3	4	4
299/B4	5	5
299/D4	6	6
299/B4	7	7
299/D4	8	8
299/B4	9	9
299/D4	10	10
299/B5	11	11
299/D5	12	12
299/B6	13	13
299/D6	14	14
299/B6	15	15
299/D6	16	16
299/B7	17	17
299/D7	18	18
299/B8	19	19
299/D8	20	20
299/B9	21	21
299/D9	22	22
299/B9	23	23
299/D9	24	24
SPARE	25	25
SPARE	26	26
SPARE	27	27
SPARE	28	28
SPARE	29	29
SPARE	30	30

REFERENCE	XTJ T.JACK	
211/D4	1	1
211/D4	2	2
211/D4	3	3
211/D4	4	4
SPARE	5	5

REFERENCE	X61 ALARM CKT.	
212/B3	1	1
212/C3	2	2
298/E2	3	3
298/E3	4	4
298/E5	5	5
298/E5	6	6
298/E6	7	7
298/E7	8	8
298/E7	9	9
SPARE	10	10
SPARE	11	11
SPARE	12	12
SPARE	13	13
SPARE	14	14
SPARE	15	15
SPARE	16	16
SPARE	17	17
SPARE	18	18
SPARE	19	19
SPARE	20	20

REFERENCE	X41 DC CKTS.	
216/B3	1	1
216/B3	2	2
216/D3	3	3
216/D3	4	4
216/D7	5	5
216/D7	6	6
216/D7	7	7
216/D7	8	8
SPARE	9	9
SPARE	10	10
227/B4	11	11
227/B4	12	12
228/B10	13	13
232/B3	14	14
232/B5	15	15
SPARE	16	16
SPARE	17	17
SPARE	18	18
SPARE	19	19
SPARE	20	20

REFERENCE	X51A CONTROL & PROT. CKTS	
296/B2	1	1
296/E2	2	2
296/B4	3	3
296/E4	4	4
296/B6	5	5
296/E6	6	6
296/B9	7	7
296/E9	8	8
SPARE	9	9
SPARE	10	10
295/E8	11	11
295/E8	12	12
295/E10	13	13
295/E3	14	14
SPARE	15	15
SPARE	16	16
SPARE	17	17
SPARE	18	18
SPARE	19	19
SPARE	20	20

REFERENCE	X51 CONTROL & PROT. CKTS	
216/E7	1	1
216/E7	2	2
232/D3	3	3
232/D4	4	4
232/D5	5	5
232/D6	6	6
SPARE	7	7
SPARE	8	8
SPARE	9	9
SPARE	10	10
SPARE	11	11
SPARE	12	12
SPARE	13	13
SPARE	14	14
276/A2	15	15
276/F2	16	16
276/A8	17	17
276/F8	18	18
276/A2	19	19
276/E2	20	20
276/A4	21	21
276/E4	22	22
276/A5	23	23
276/E5	24	24
277/A4	25	25
277/F4	26	26
277/A7	27	27
277/F7	28	28
277/A5	29	29
277/E5	30	30
291/A4	31	31
291/C4	32	32
291/D4	33	33
291/E4	34	34
291/B7	35	35
291/C7	36	36
291/B7	37	37
291/C7	38	38
SPARE	39	39
SPARE	40	40
291/A9	41	41
291/B9	42	42
SPARE	43	43
292/A7	44	44
292/A9	45	45
292/B7	46	46
293/E1	47	47
293/E2	48	48
293/E3	49	49
293/E4	50	50

REFERENCE	X51 CONTROL & PROT. CKTS	
293/E4	51	51
293/E6	52	52
293/E7	53	53
293/B6	54	54
293/D6	55	55
293/B6	56	56
293/D6	57	57
293/E9	58	58
293/E9	59	59
293/E10	60	60
293/B9	61	61
293/E9	62	62
294/E1	63	63
294/E2	64	64
294/E3	65	65
294/B2	66	66
294/D2	67	67
294/B3	68	68
294/B6	69	69
294/D6	70	70
294/B7	71	71
294/E4	72	72
294/E4	73	73
294/E7	74	74
294/B10	75	75
294/D10	76	76
294/E9	77	77
294/E9	78	78
294/E10	79	79
295/E2	80	80
295/E2	81	81
295/E3	82	82
295/E3	83	83
295/E4	84	84
295/E5	85	85
295/E5	86	86
295/E6	87	87
295/E6	88	88
295/E7	89	89
SPARE	90	90
SPARE	91	91
SPARE	92	92
SPARE	93	93
SPARE	94	94
SPARE	95	95
SPARE	96	96
SPARE	97	97
SPARE	98	98
SPARE	99	99
SPARE		

REFERENCE	X53 CONTROL & PROT. CKTS	
227/D4	1	1
227/D4	2	2
227/D4	3	3
227/D5	4	4
227/D5	5	5
227/D5	6	6
227/D6	7	7
227/D6	8	8
SPARE	9	9
SPARE	10	10
228/D2	11	11
228/D2	12	12
228/D2	13	13
228/D3	14	14
228/D3	15	15
228/D3	16	16
228/D4	17	17
228/D4	18	18
228/D5	19	19
228/D5	20	20
228/D5	21	21
228/D6	22	22
228/D6	23	23
228/D6	24	24
228/D7	25	25
228/D7	26	26
228/D8	27	27
228/D8	28	28
228/D8	29	29
228/D9	30	30
228/D9	31	31
228/D9	32	32
SPARE	33	33
SPARE	34	34
SPARE	35	35

REFERENCE	X6 ALM. CKT.	
212/B3	1	1
212/B3	2	2
298/E1	3	3

REFERENCE	XSH SPACE HEATER	
211/C4	1	1
211/D4	2	2
SPARE	3	3

AS-BUILT BY _____ DATE _____

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TERMINAL BLOCK REFERENCE

132/13.8kV GT-2 RELAY PANEL-1 +R01.1

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
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NG/D2-D (2012/01)

DMS VECTOR NGD200

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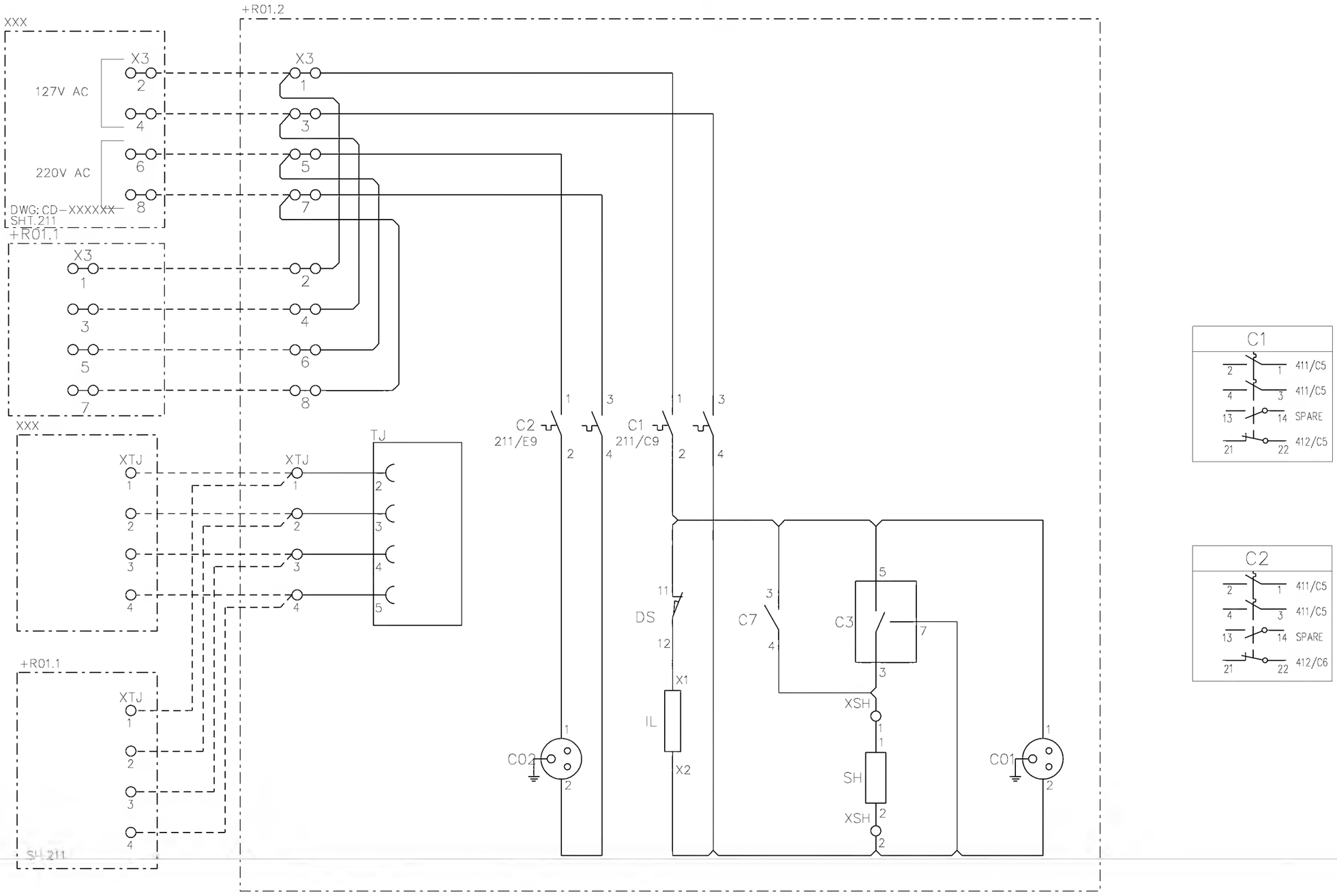

AS-BUILT BY ____ DATE ____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED ____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

AC SUPPLY FOR ILLUMINATION & POWER SOCKET
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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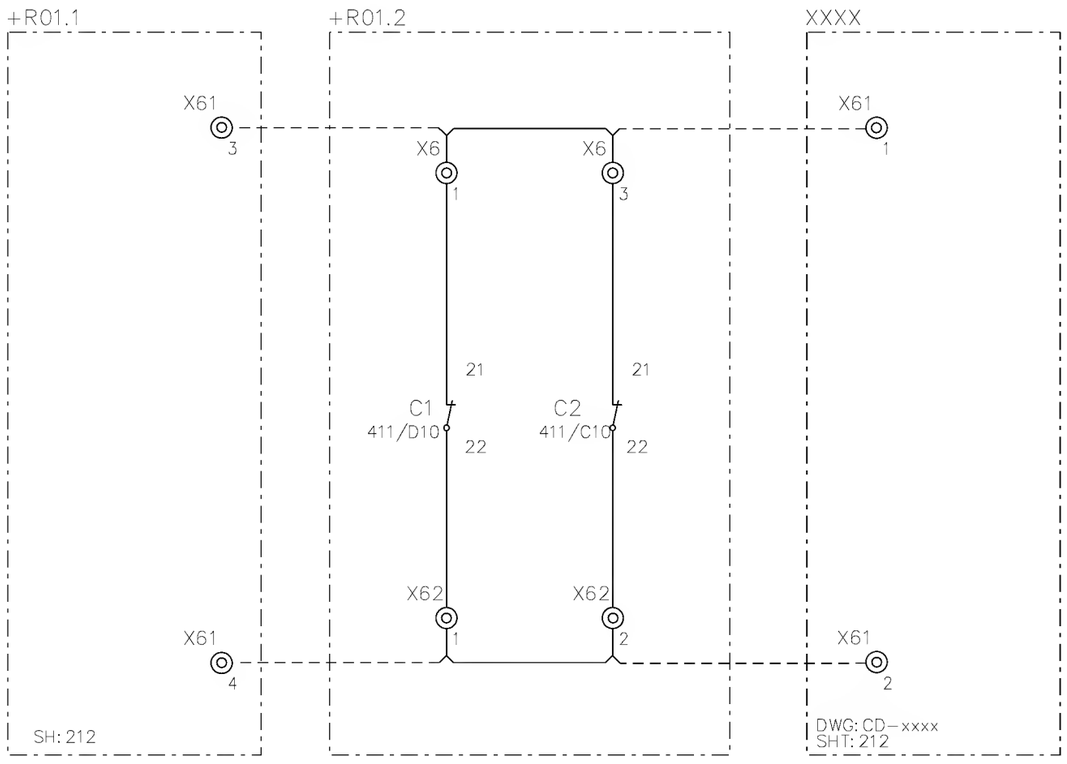

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	CUB.LIGHTING,HEATER&SOKET ALARM CKT.	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
			132/13.8kV GT-2 RELAY PANEL-2 +R01.2		
01 / 13 49 / FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY JKR	S/S 8709-132/13.8KV IN AL-KHARJ CITY		
00 / 13 04 / FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED	RIYADH SAUDI ARABIA		
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC			

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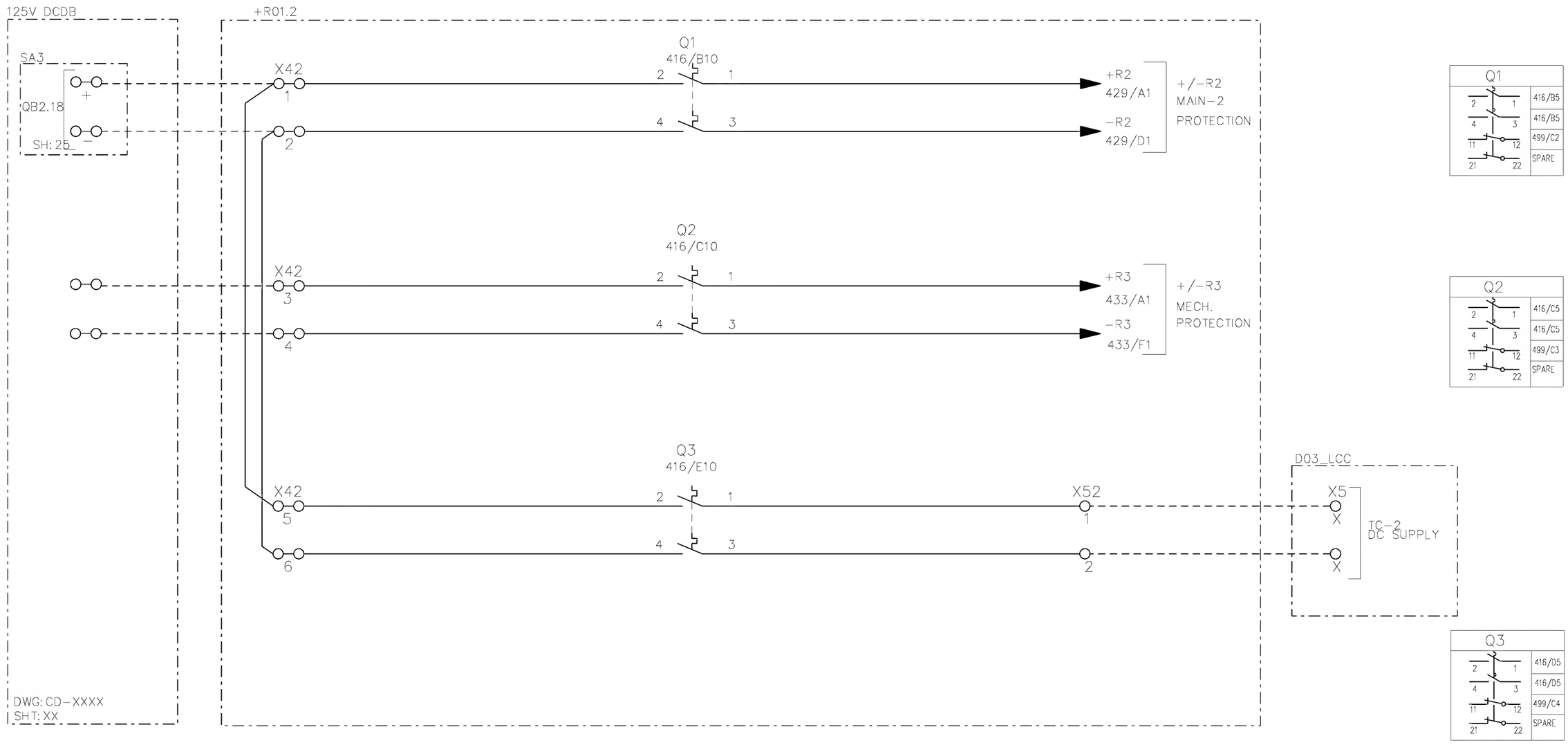

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	DC SUPPLY DISTRIBUTION
			132/13.8kV GT-2 RELAY PANEL-2 +R01.2
			S/S 8709-132/13.8KV IN AL-KHARJ CITY
			RIYADH SAUDI ARABIA

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

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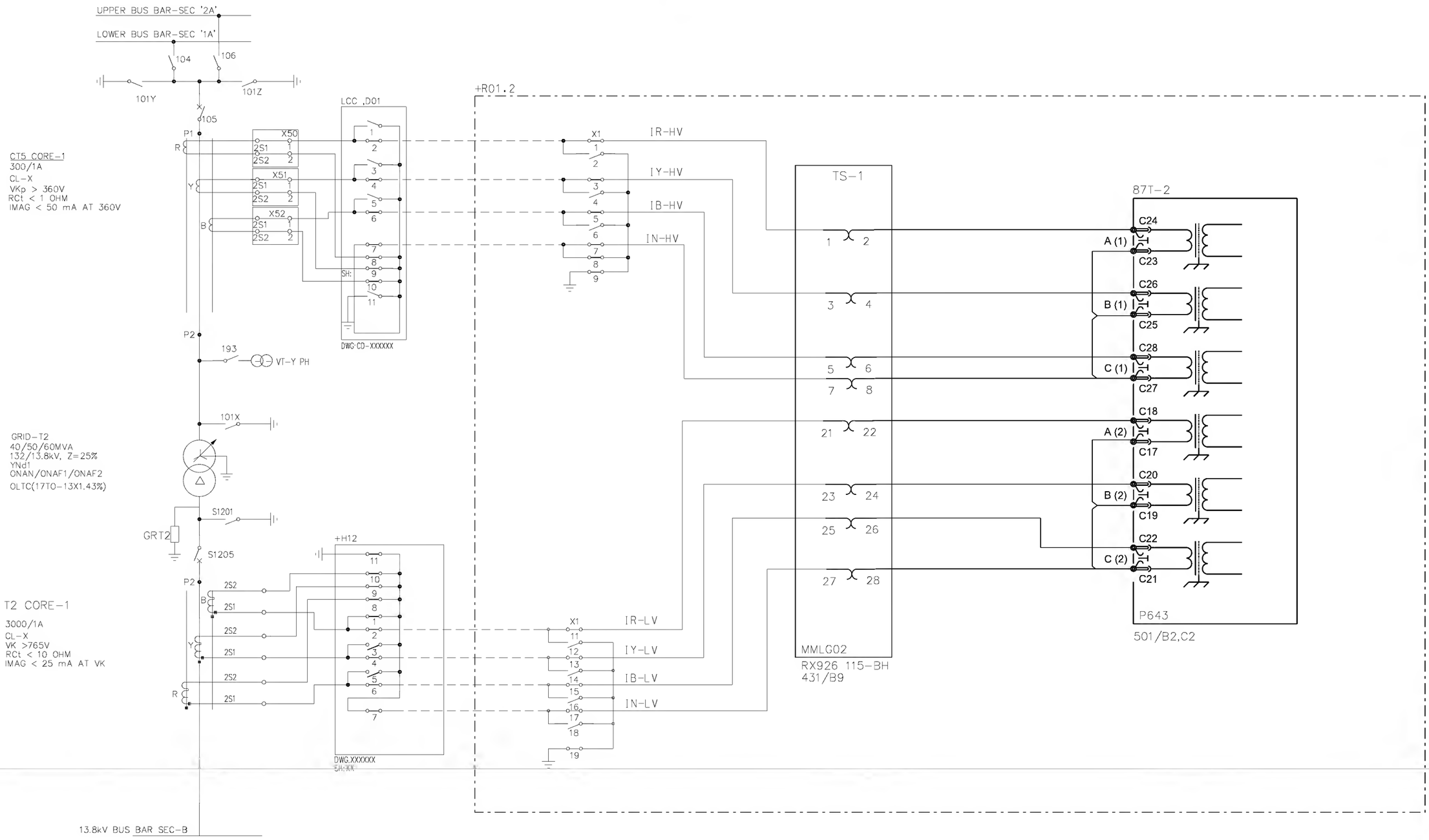

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/00

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CT CIRCUITS 87T-2 RELAY

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

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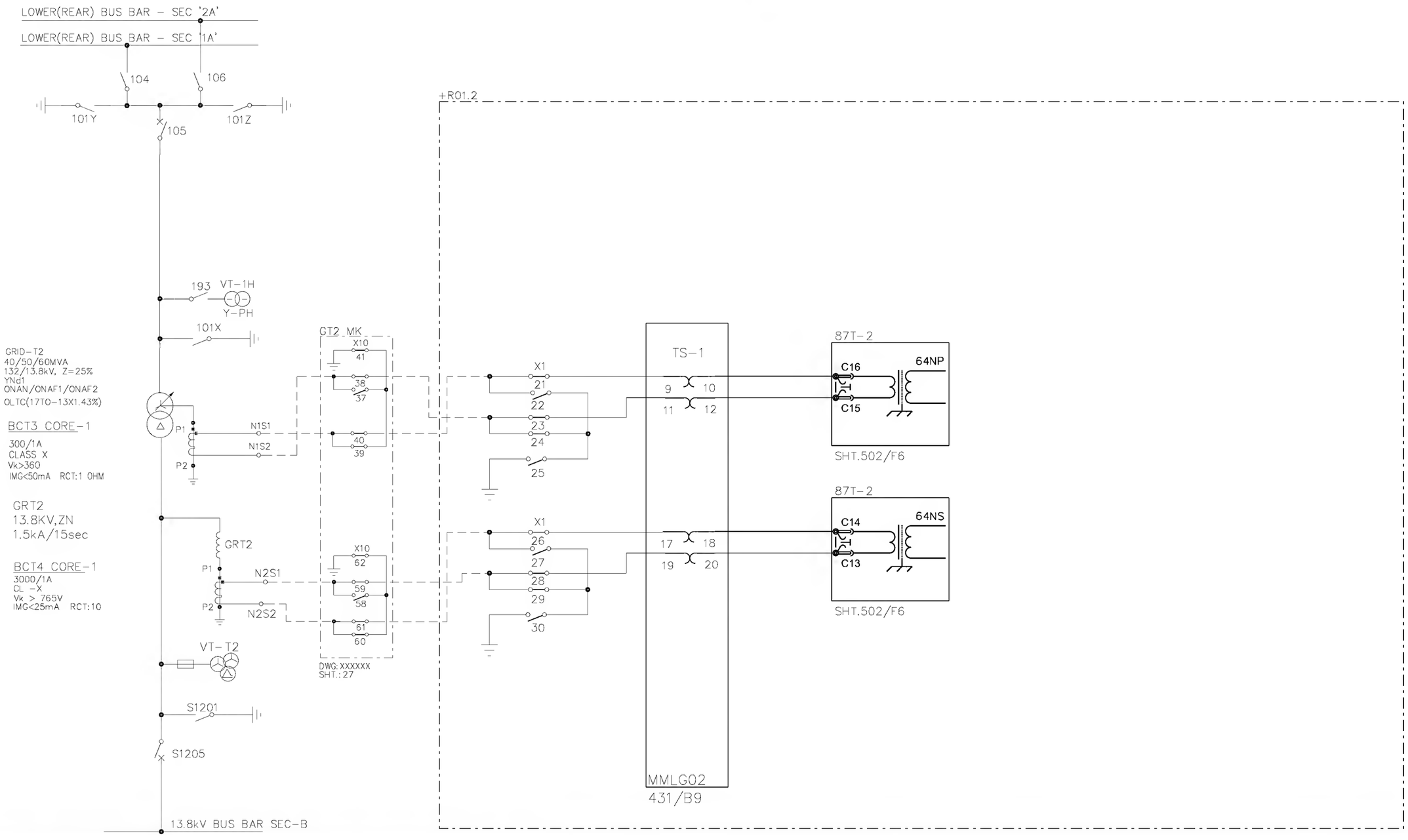

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CT CIRCUITS 87T-2 RELAY

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	422	423	01

NG/D2-D (2012/01)

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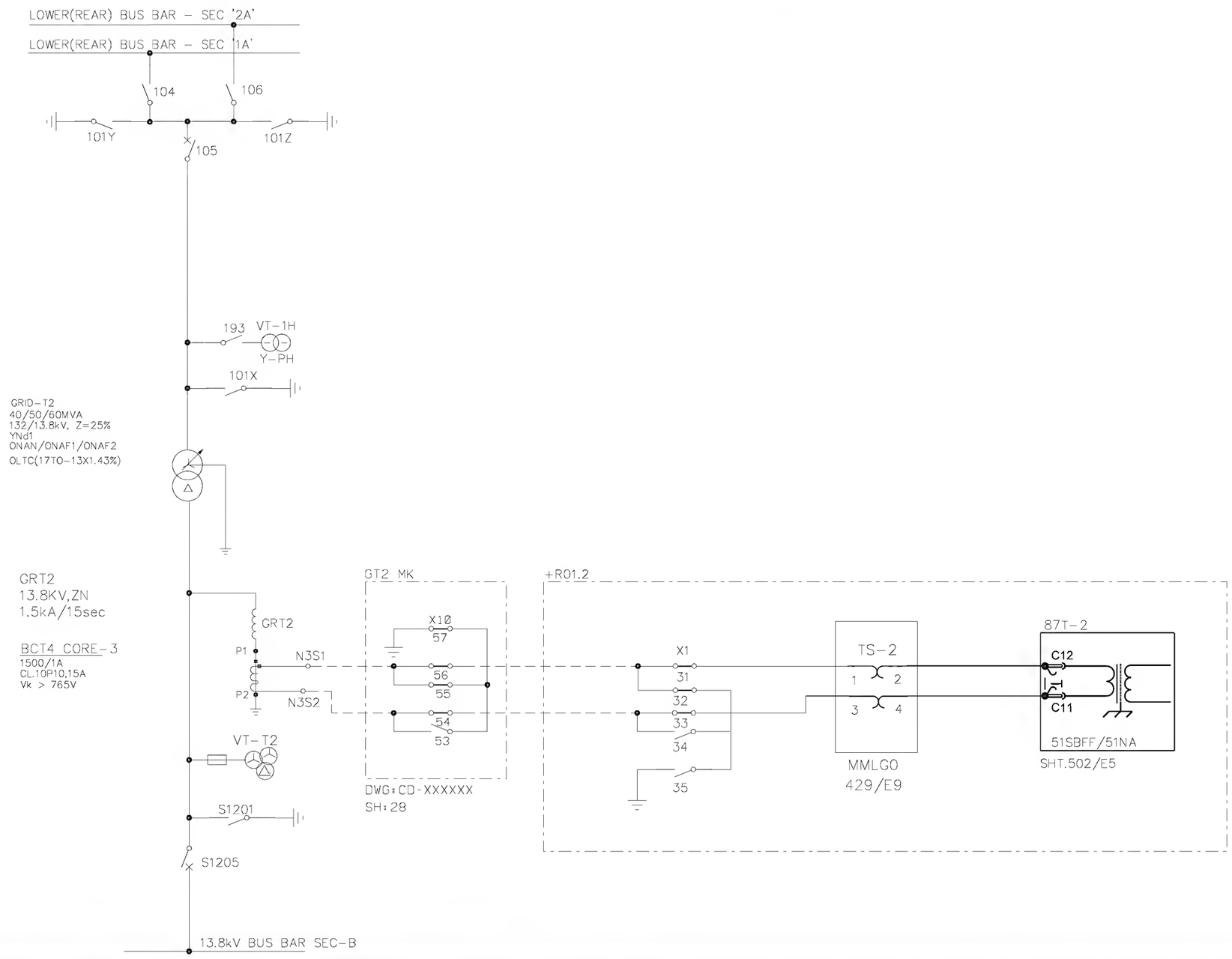

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CT CIRCUITS 87T-2 RELAY

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	423	424	01

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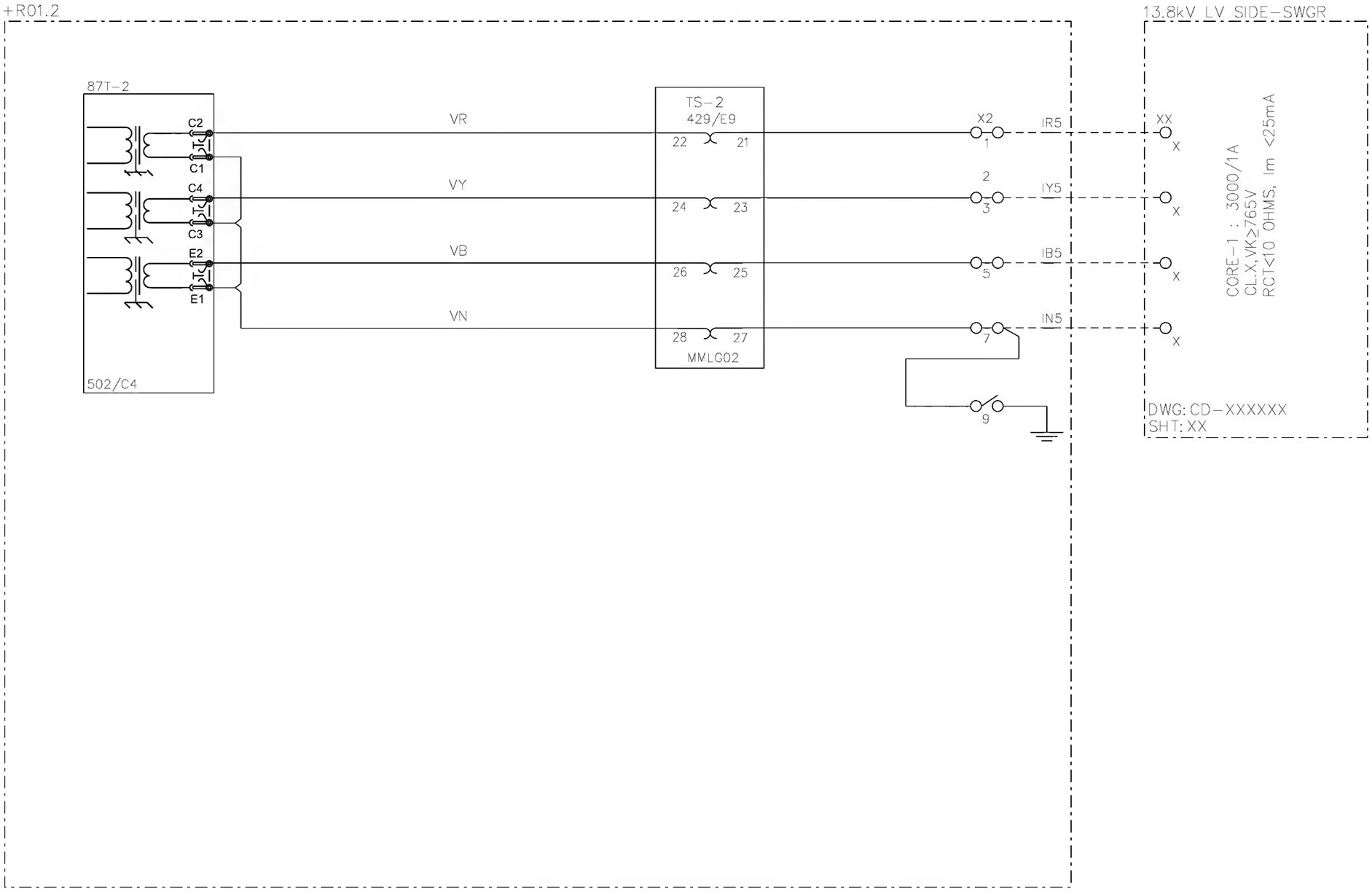

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CT & VT CIRCUITS 87T-2 RELAY
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	424	429	01

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DMS VECTOR NGD200

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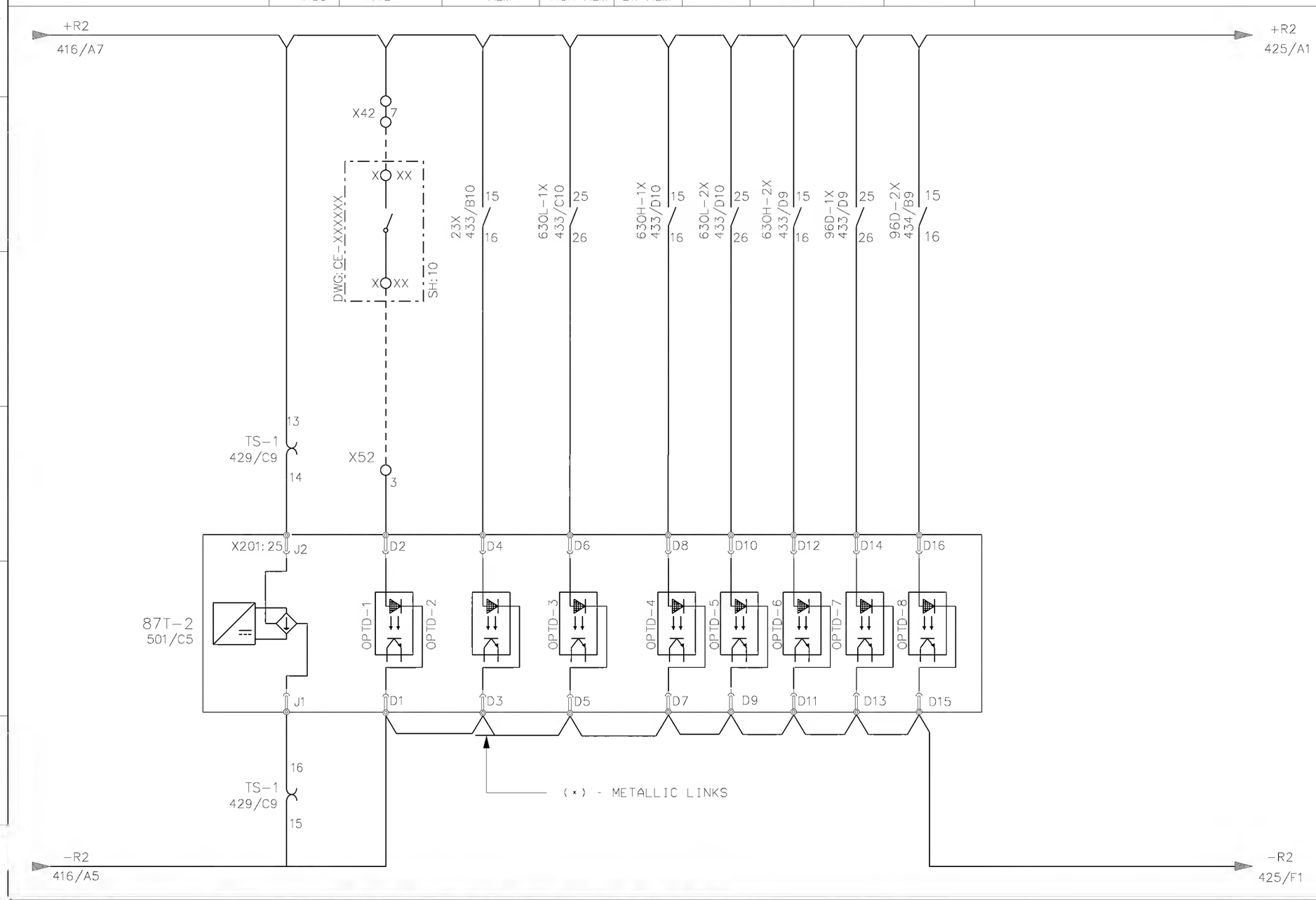
	VT	TR COOLER	MAIN TNK	MAIN TNK	OLTC OIL	OLTC OIL	MAIN TNK	OLTC
87T-2	MCB	FAIL	OIL LVL	FAIL	LVL LW	LVL HC	PRESSURE	PRES RELIEF
PSU	FAIL	ALM	HGH ALM	LW ALM	ALM	ALM	ALARM	ALARM



TS-1

1	2	421/B7	
3	4	421/C7	
5	6	421/C7	
7	8	421/C7	
9	10	422/C5	
11	12	422/C5	
13	14	429/D3	
15	16	429/F3	
17	18	422/D5	
19	20	422/E5	
21	22	421/D7	
23	24	421/D7	
25	26	421/D7	
27	28	421/E7	

MMLG02

TS-2

1	2	423/D6
3	4	423/D6
5	6	SPARE
7	8	432/D2
9	10	SPARE
11	12	432/D6
13	14	493/D5
15	16	493/D6
17	18	SPARE
19	20	SPARE
21	22	424/B6
23	24	424/B6
25	26	424/B6
27	28	424/C6

MMLG02

TS-3

1	2	496/D2
3	4	496/D4
5	6	496/D5
7	8	496/D6
9	10	SPARE
11	12	SPARE
13	14	SPARE
15	16	SPARE
17	18	SPARE
19	20	SPARE
21	22	SPARE
23	24	SPARE
25	26	SPARE
27	28	SPARE

MMLG02

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

87T-2 BINARY INPUTS

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	429	430	01

NG/D2-D (2012/01)

DMS VECTOR NGD200

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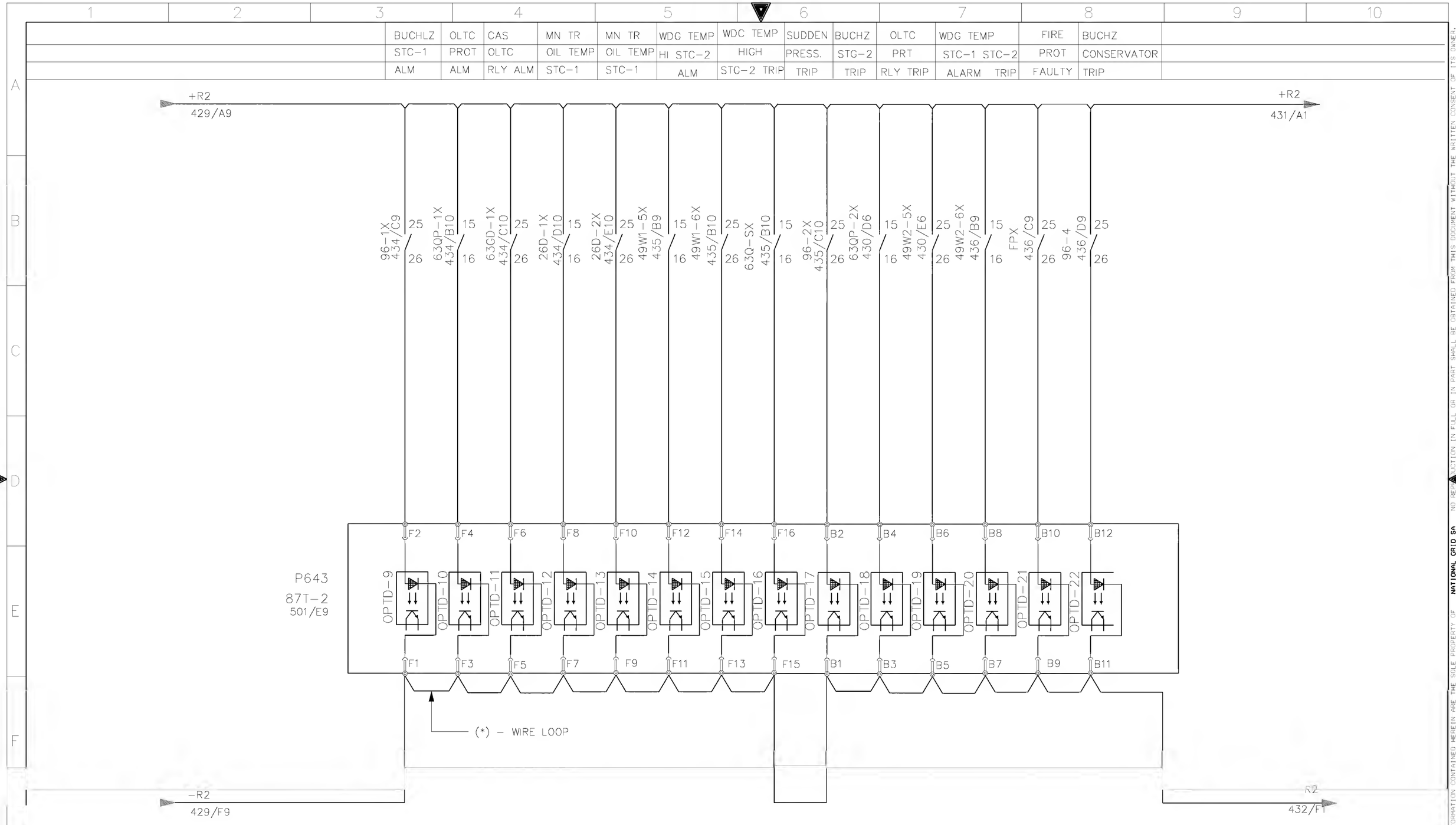

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	87T-2 BINARY INPUTS	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
	DRAWN BY RIZ	CHECKED BY JKR	132/13.8kV GT-2 RELAY PANEL-2 +R01.2		
01 / 13 49 / FACTORY ASBUILT	DATE STARTED 24.01.2013	DATE COMPLETED _____	S/S 8709-132/13.8KV IN AL-KHARJ CITY		
00 / 13 04 / FOR APPROVAL	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA		

REV. NO.	DATE	DESCRIPTION

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	430	432	01

NG/D2-D (2012/01)

DMS VECTOR NGD200

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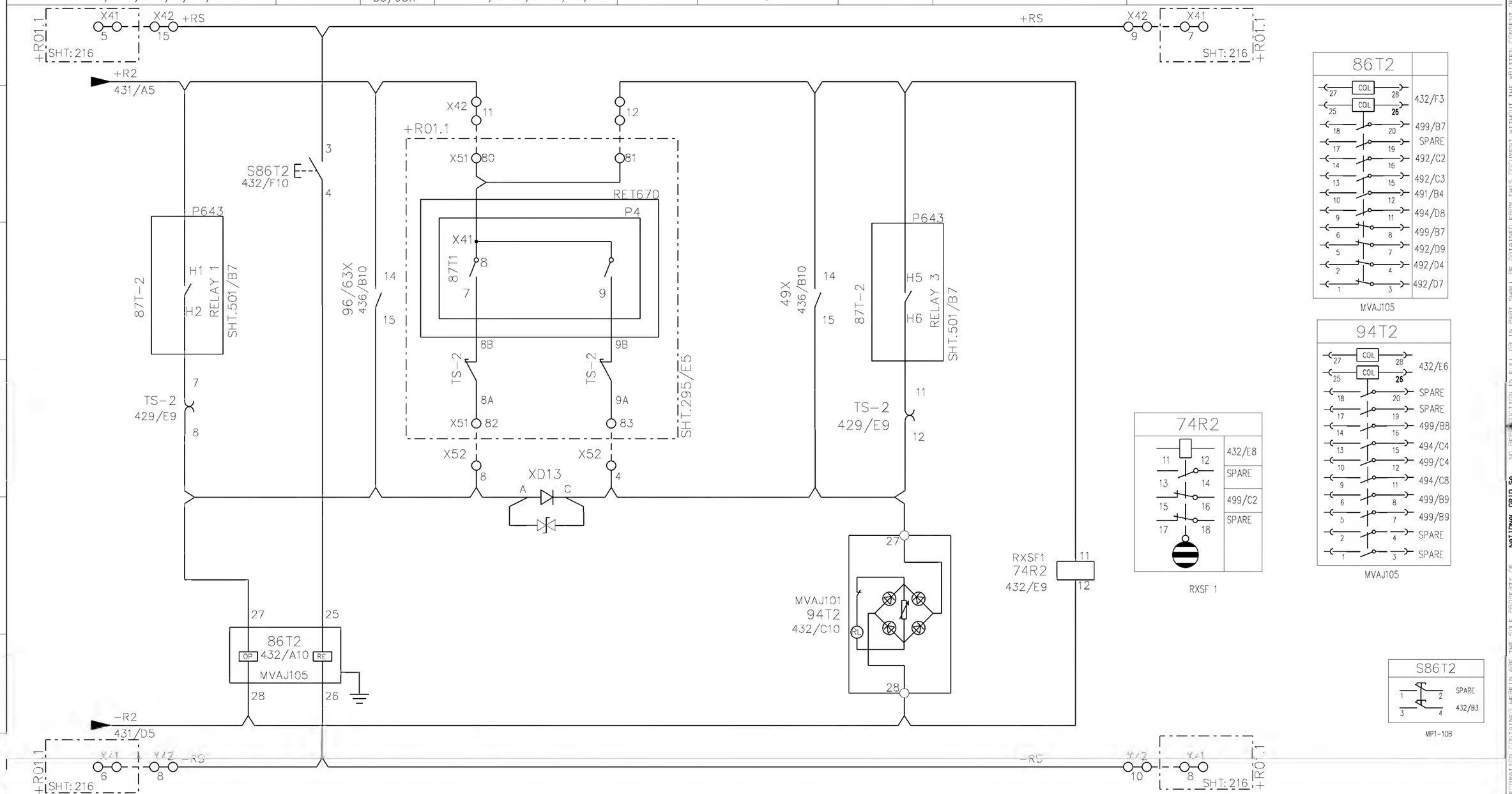
TRANSF. DIFF. MAIN-2 PROTECTION TRIP – 86T2							
TRANSF. DIFFL. PROTN.	TRIP RELAY	MECH TRIP	TRANSF. DIFFL. PROTN.		MECH TRIP	51NSBEF	R2± DC SUPVN.
87T-2/64NP/64NS/50/51P/51N SBEF	RESET	63/96X	87T1/64NP/64NS/50/51P	51N	49X	TRIP	SUPPLY



AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	MAIN-2 TRANSF DIFFL PROT TRIP RELAY CIRCUIT
			132/13.8kV GT-2 RELAY PANEL-2 +R01.2
			S/S 8709-132/13.8KV IN AL-KHARJ CITY
			RIYADH SAUDI ARABIA

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	432	433	01

NG/D2-D (2012/01)
DMS VECTOR NGD200

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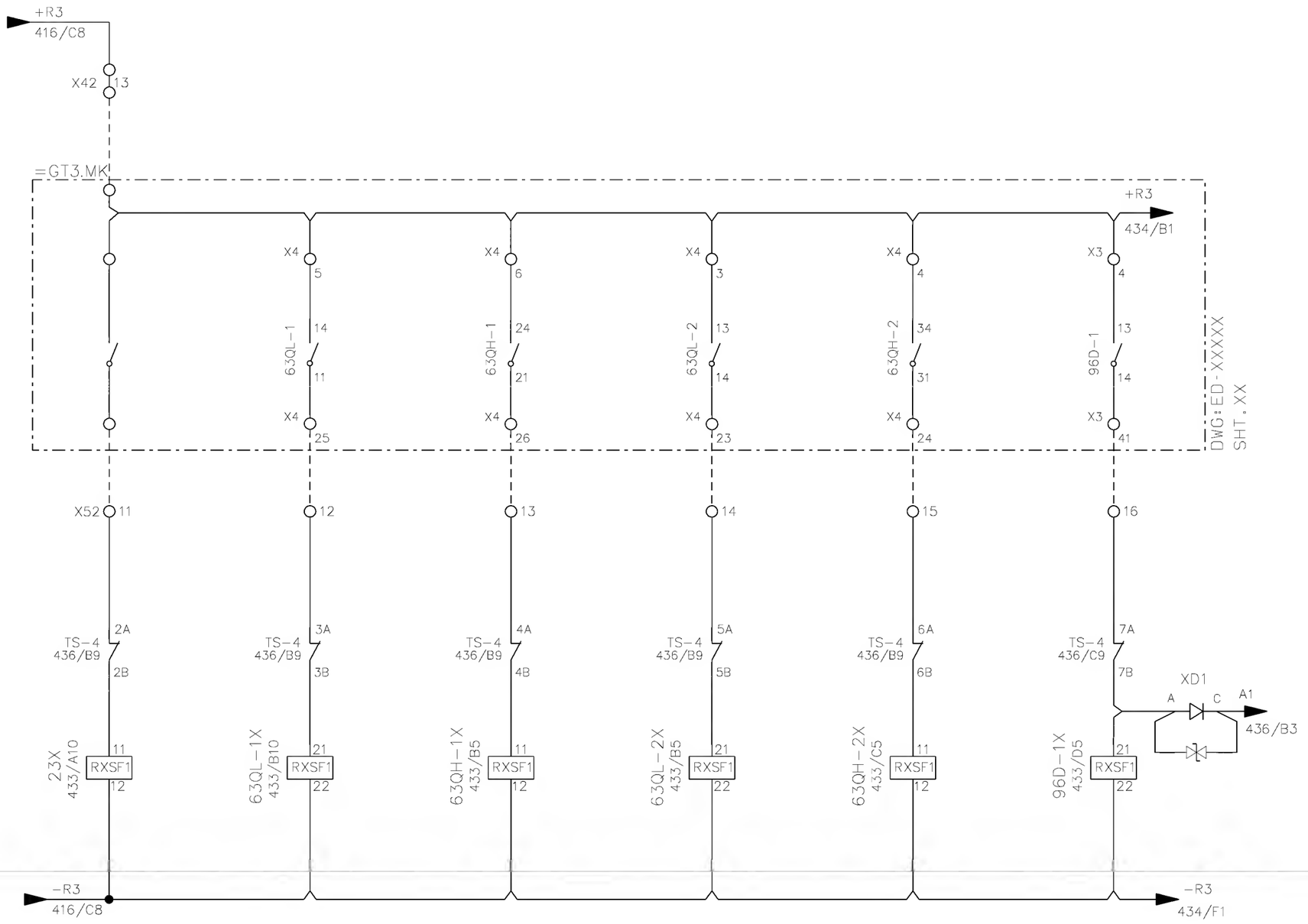
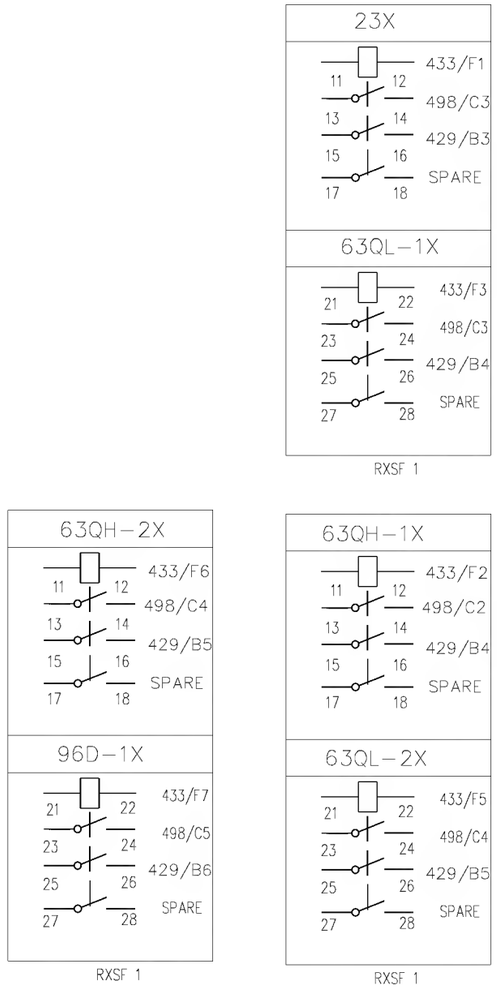
	TR COOLER	MAIN TANK	MAIN TANK	OLTC OIL	OLTC	MAIN TANK
	FAIL	OIL LEVEL	OIL LEVEL	LEVEL LOW	OIL LEVEL	PRESS RELIEF
	ALARM	LOW ALARM	HIGH ALARM	ALARM	HIGH ALARM	TRIP





+R01.2

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TRANS .MECH.PROTN.CONTACT MULTI.CKT
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	433	434	01

NG/D2-D (2012/01)
DMS VECTOR NGD200

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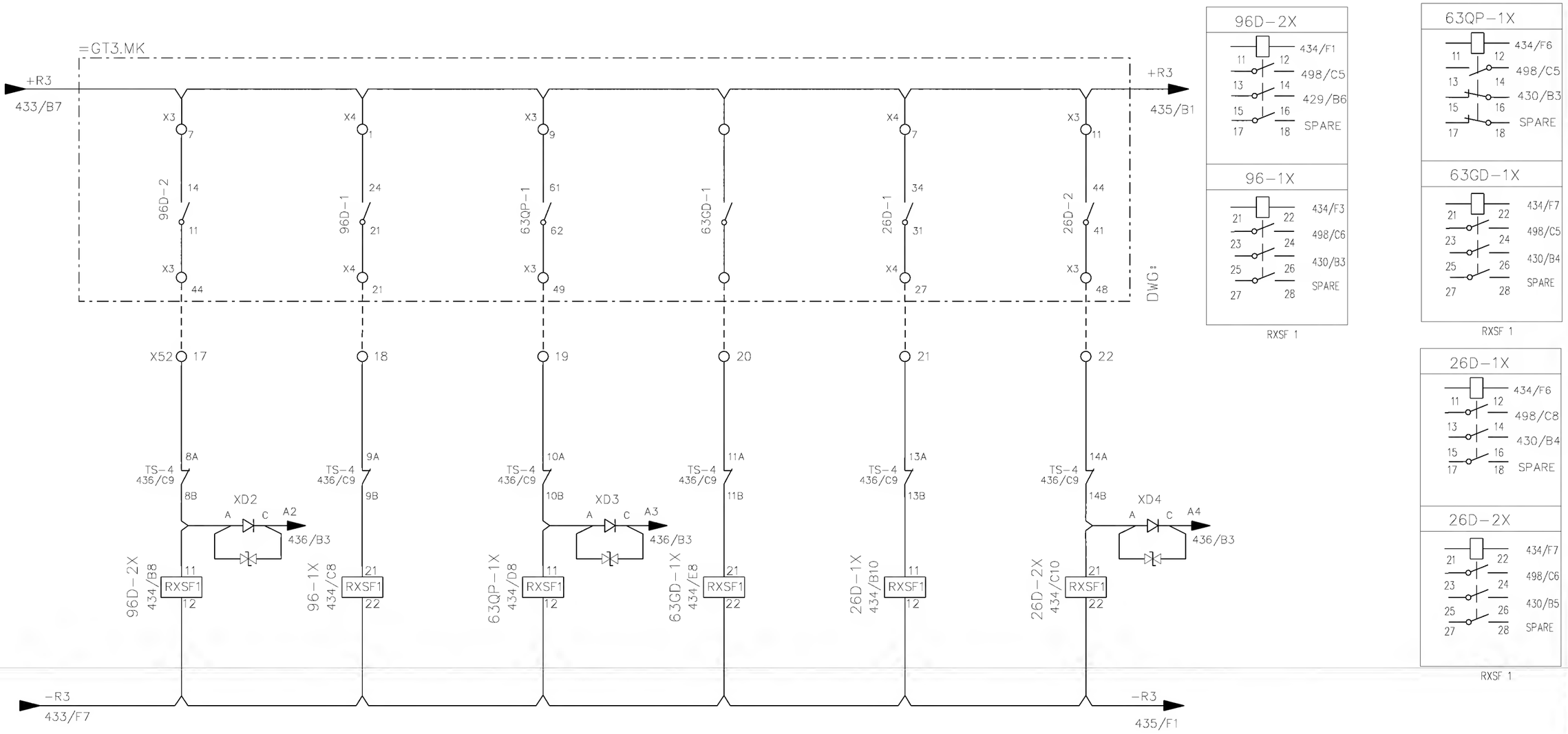
OLTC	BUCHHOLZ	OLTC	GAS	MAIN TR	MAIN TR
PRESS RELIEF	STC-1	PROTECTIVE	DETECT	OIL TEMP	OIL TEMP
TRIP	ALARM	TRIP	RELAY ALARM	STG-1 ALARM	HIGH STG-2 TRIP



+RC1.2

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TRANS .MECH.PROTN.CONTACT MULTI.CKT
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
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INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	434	435	01

NG/D2-D (2012/01)
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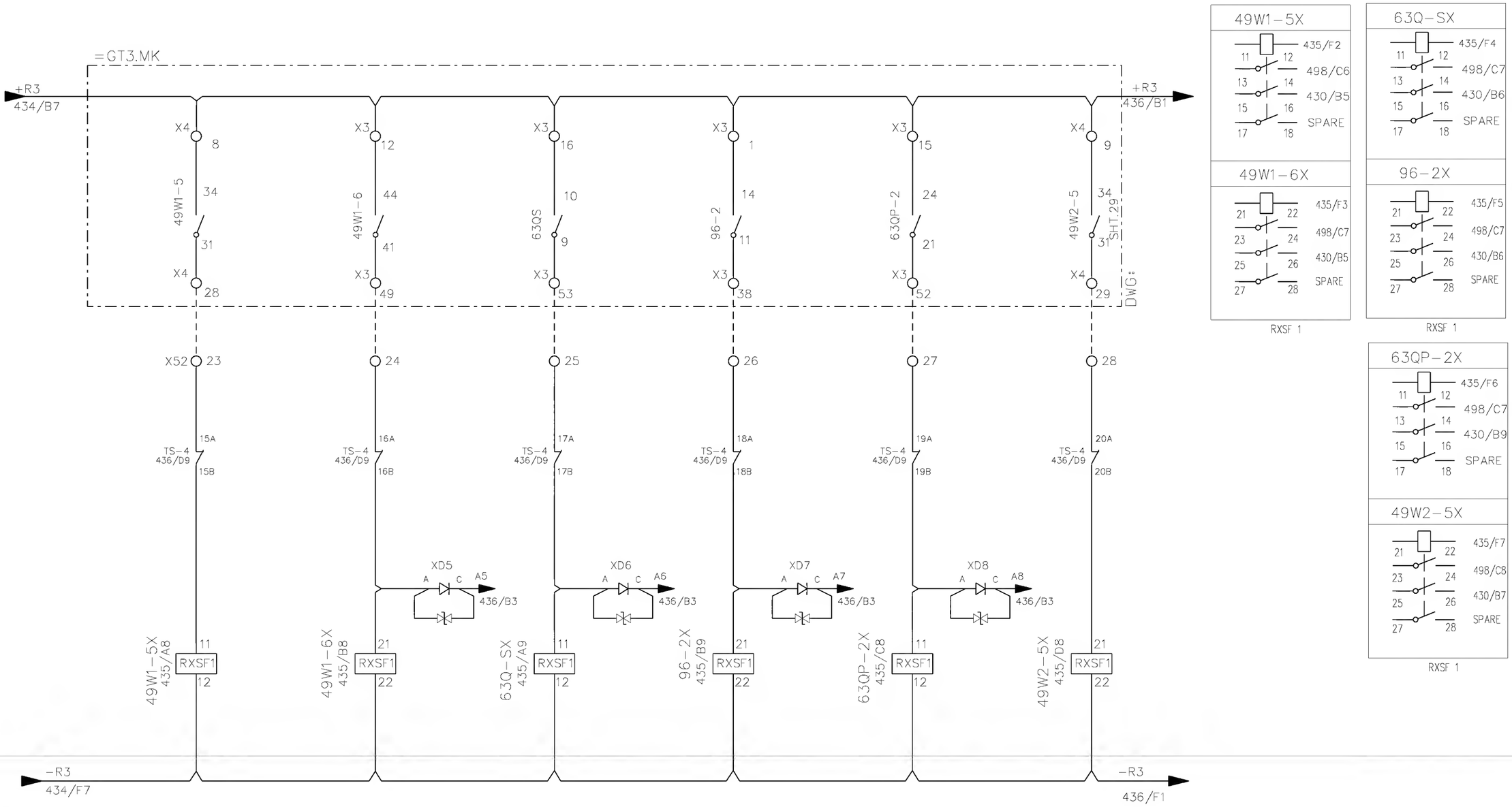
	WDG TEMP HIGH STG-1 ALARM (HV)	WDG TEMP HIGH STG-2 TRIP (HV)	SUDDEN PRESSURE TRIP	BUCHZ STAGE-2 TRIP	OLTC PROTECTIVE RELAY TRIP	WDG TEMP HIGH STG-1 ALARM (LV)



REV. NO.	DATE	DESCRIPTION
Ø1	13 49	FACTORY ASBUILT
ØØ	13 Ø4	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/ØØ

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.Ø1.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TRANS.MECH.PROTN.CONTACT.MULTI.CKT

132/13.8kV GT-2 RELAY PANEL-2 +RØ1.2

S/S 87Ø9-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	435	436	Ø1

NG/D2-D (2012/Ø1)

DMS VECTOR NGD2ØØ

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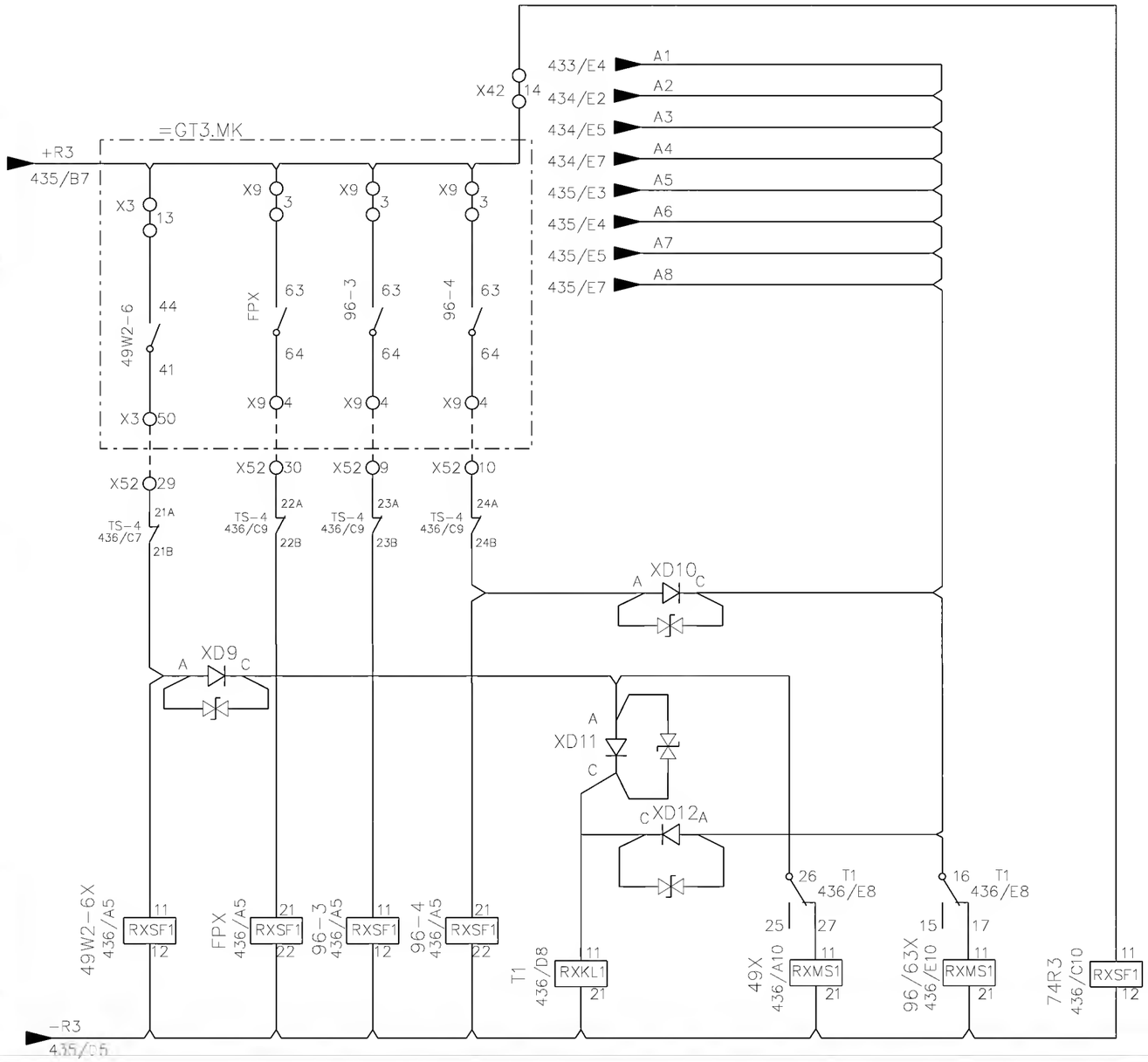
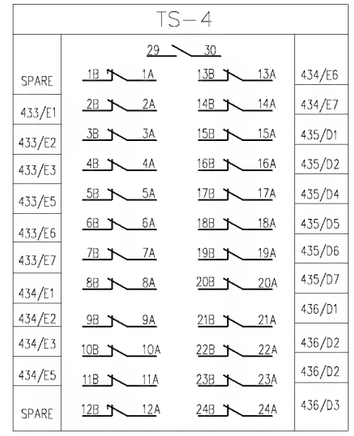
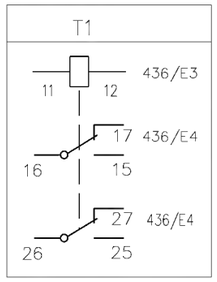
WINDING-2	FIRE	BUCHLTZ		MECHANICAL
TEMP HIGH	PROTN.	CONSERVATOR		PROTECTION
STAGE-2 TRIP (LV)	FAULTY	ALARM	TRIP	TRIPPING

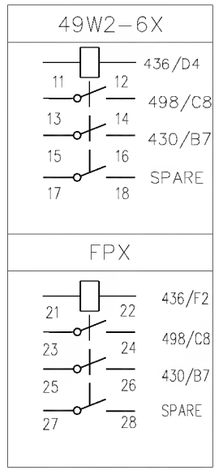
+R3

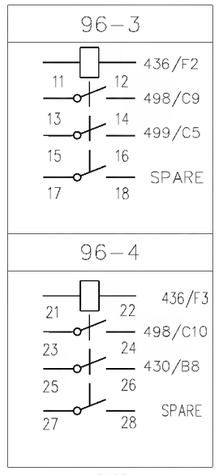
DC SUPERVISION

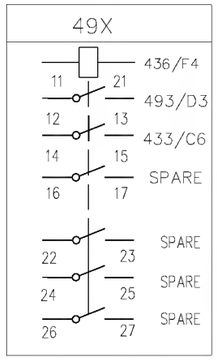


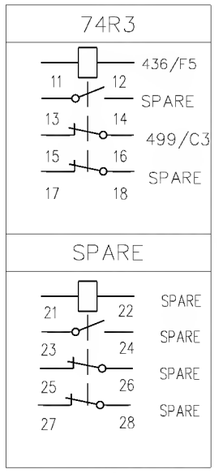


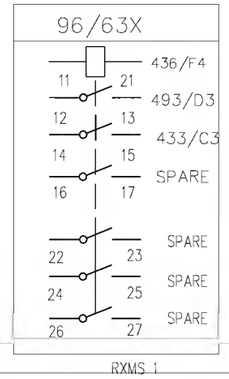












AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TRANS MECH.PROTN.CONTACT.MULTI.CKT

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	436	491	01

NG/D2-D (2012/01)

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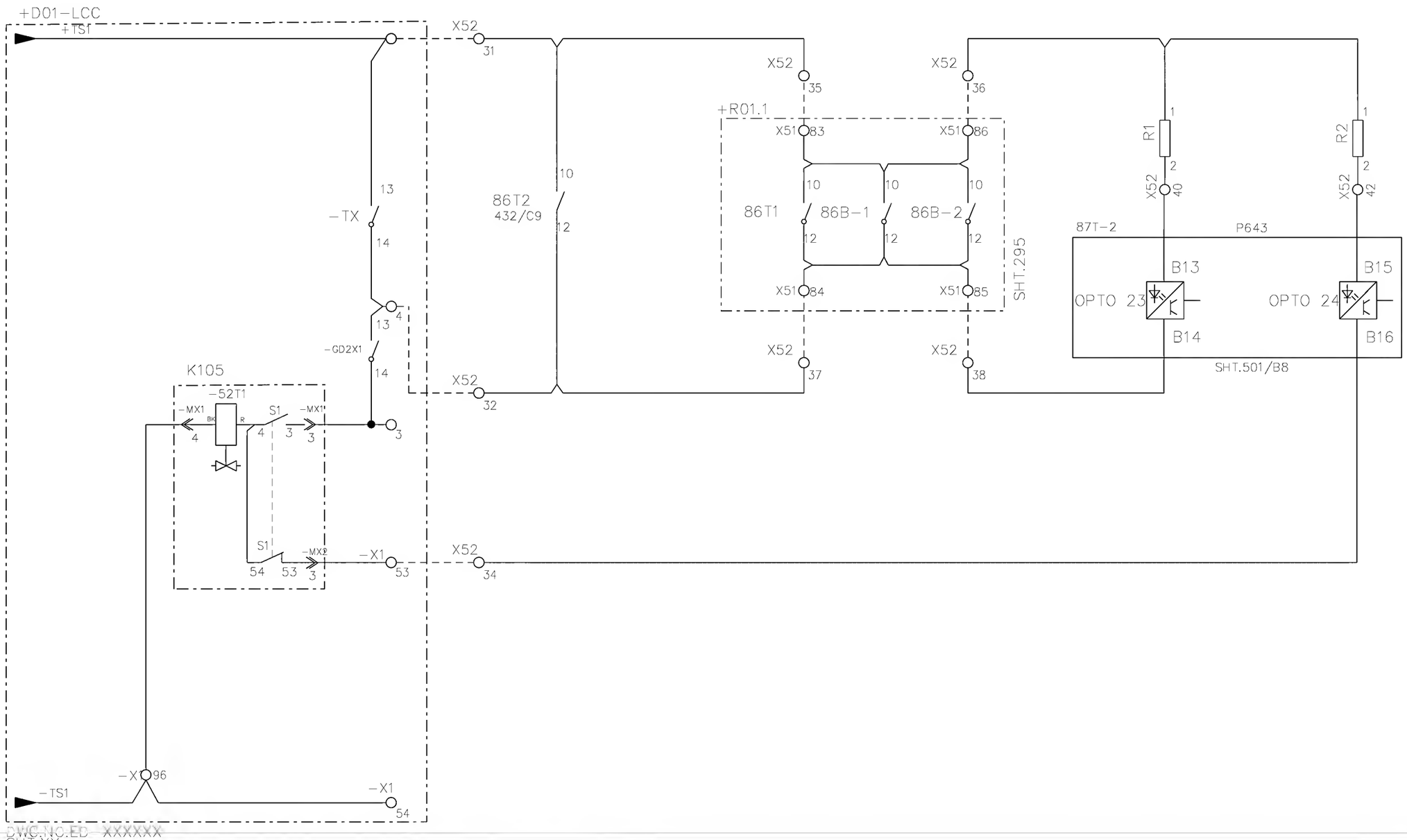
TRIP CIRCUIT-2 SUPVN.

TRANSFORMER DIFF PROTN TRIP	SUPERVISION RELAY
86T2	27TC2



AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CB K305 TRIP CIRCUIT-2 SUPERVISION CIRCUIT
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	491	492	01

NG/D2-D (2012/01)
DMS VECTOR NGD200

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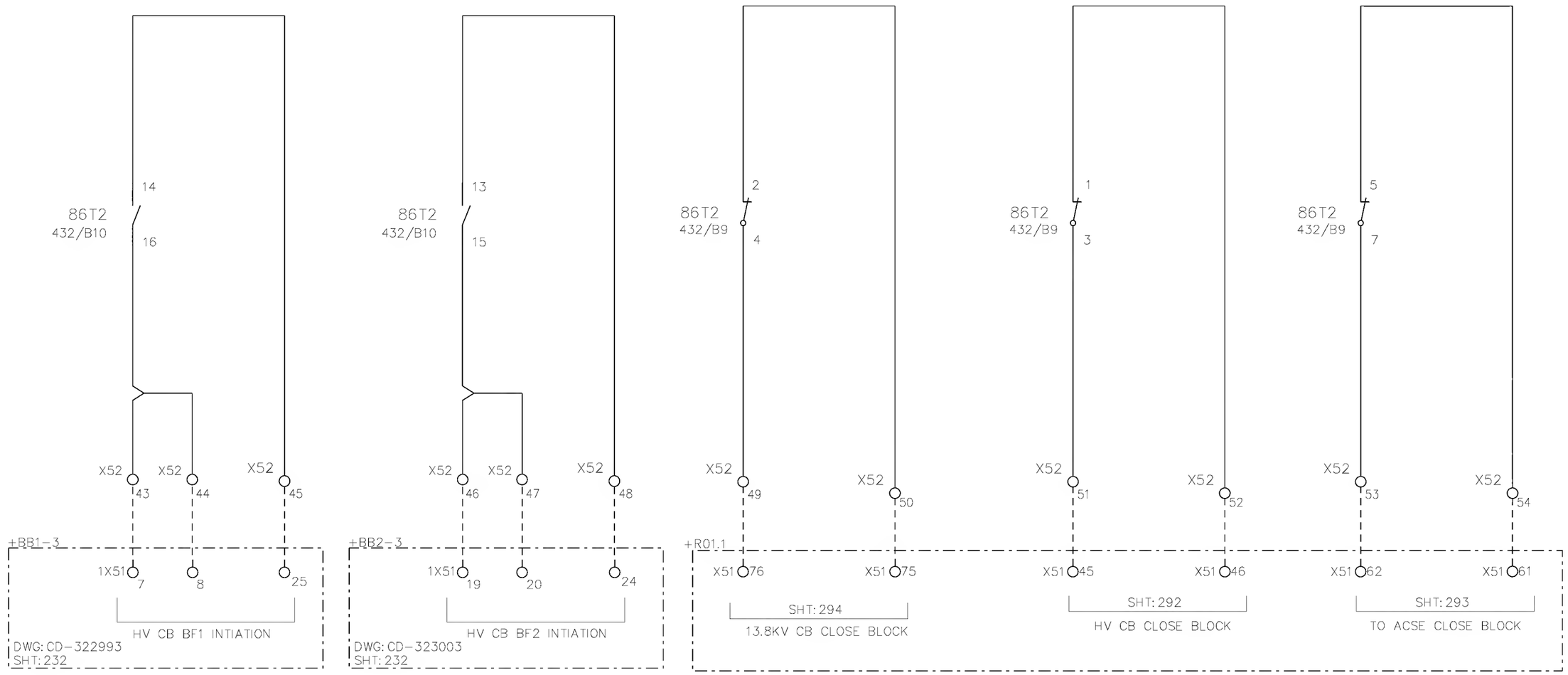

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	BF INI & CLOSE BLOCK CIRCUIT	الشركة الوطنية لنقل الكهرباء	نقل الكهرباء National Grid SA
			132/13.8kV GT-2 RELAY PANEL-2 +R01.2		
01 / 13 49 / FACTORY ASBUILT	DRAWN BY RIZ	CHECKED BY JKR	S/S 8709-132/13.8KV IN AL-KHARJ CITY	INDEX / PLANT NO. / DRAWING NUMBER / SHEET NO. (SHT, CONT.) / REV. NO.	
00 / 13 04 / FOR APPROVAL	DATE STARTED 24.01.2013	DATE COMPLETED	RIYADH SAUDI ARABIA	- / C421 / CD-322931 / 492 493 / 01	
REV. NO. / DATE / DESCRIPTION	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC			

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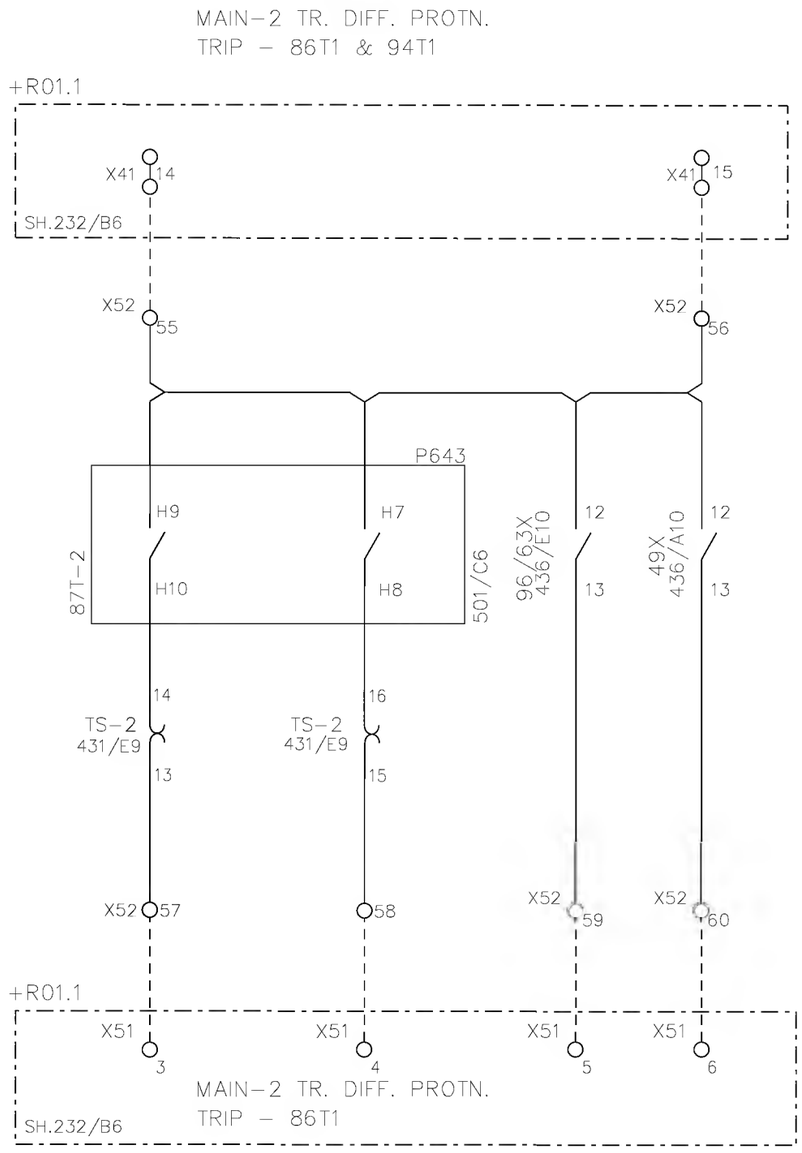
NG/D2-D (2012/01)

DMS VECTOR NGD200



+R01.2

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TRANSFORMER MECHANICAL PROTN.
132/13.8kV GT-2 RELAY PANEL-2 +R01.2
S/S 8709-132/13.8KV IN AL-KHARJ CITY
RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
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-	C421	CD-322931	493	494	01

NG/D2-D (2012/01)
DMS VECTOR NGD200

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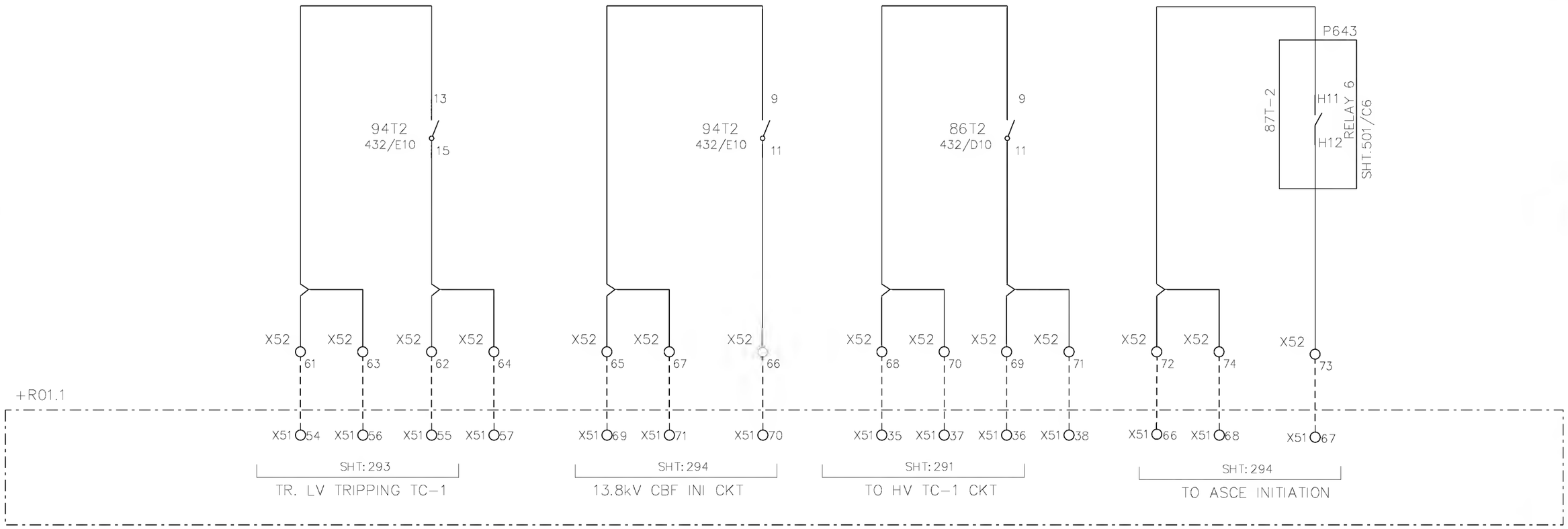

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CONTACTS FOR TRIP AND CLOSE BLOCK

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	494	496	01

NG/D2-D (2012/01)

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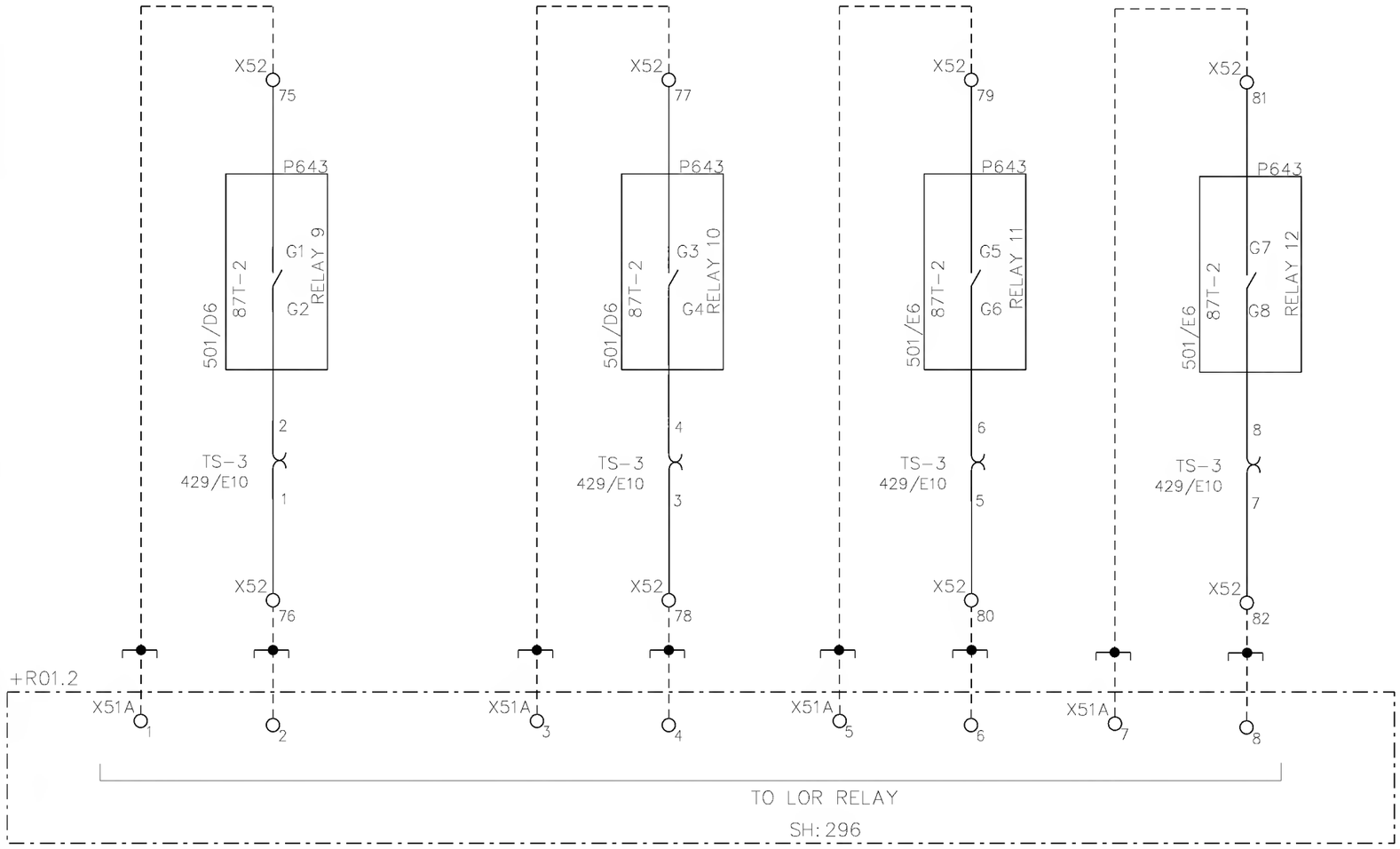

AS-BUILT BY _____ DATE _____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

CONTACTS FOR U/F LOAD SHEDDING

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء
نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	496	498	01

NG/D2-D (2012/01)
DMS VECTOR NGD200

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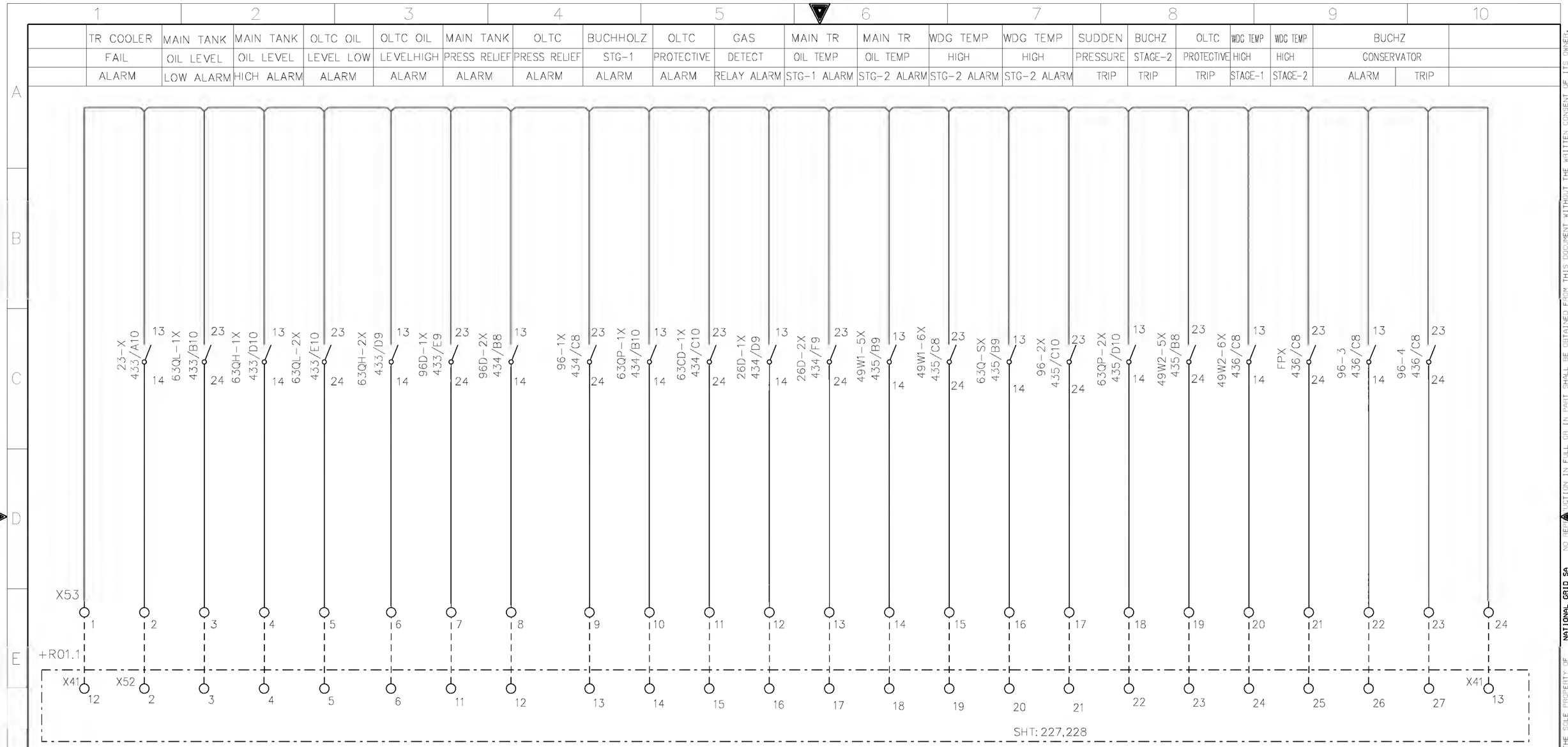

REV. NO.	DATE	DESCRIPTION
Ø1	13 49	FACTORY ASBUILT
ØØ	13 Ø4	FOR APPROVAL

AS-BUILT BY _____ DATE _____

CONTRACT NO. 11131113/ØØ

JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.Ø1.2013 DATE COMPLETED _____

DPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

MECH PROTN. ALARM CIRCUIT FOR SET-1

132/13.8kV GT-2 RELAY PANEL-2 +RØ1.2

S/S 8ØØ9-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

نقل الكهرباء
National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	498	499	Ø1

NG/D2-D (2012/01)

DMS VECTOR NGD2ØØ

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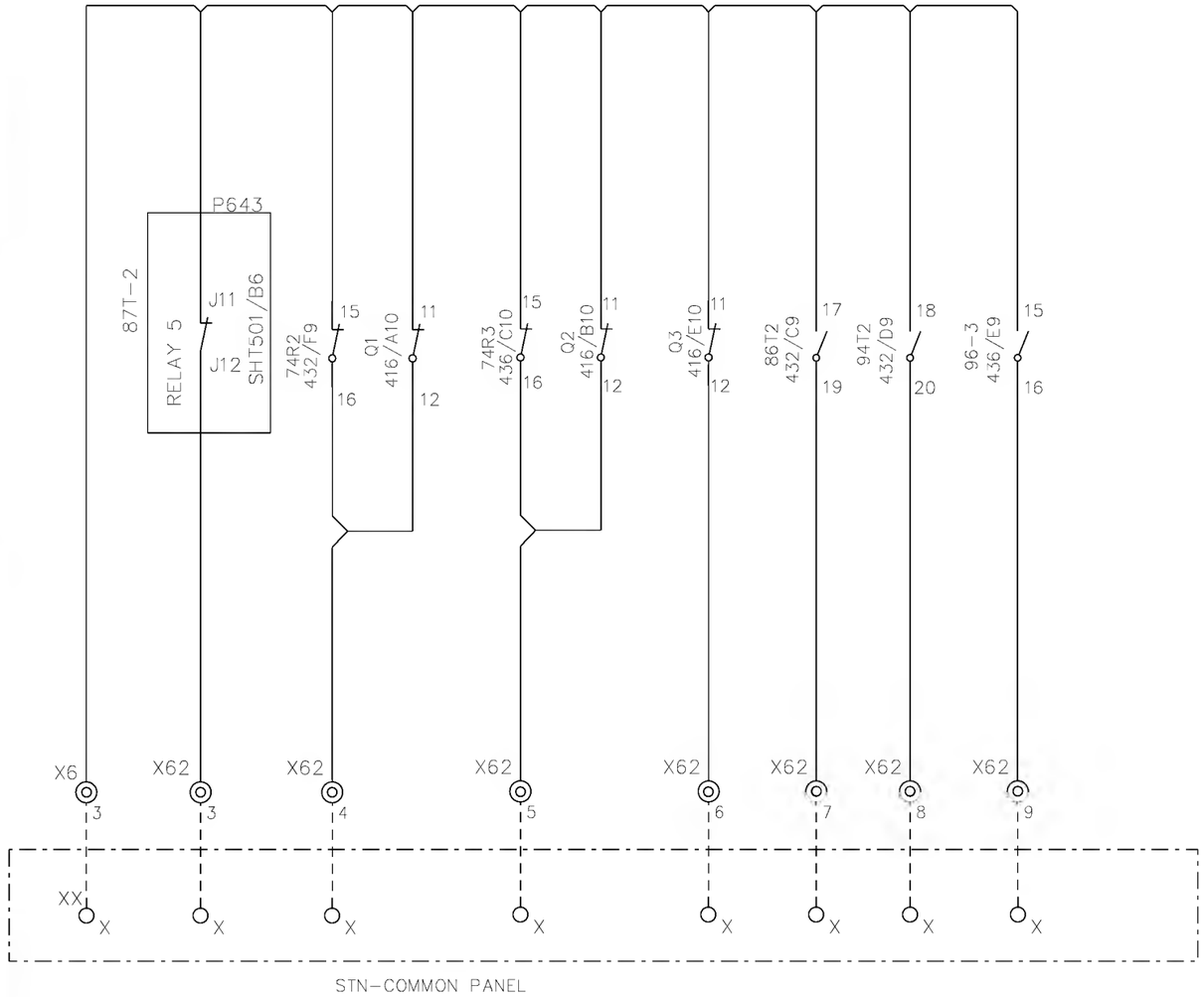
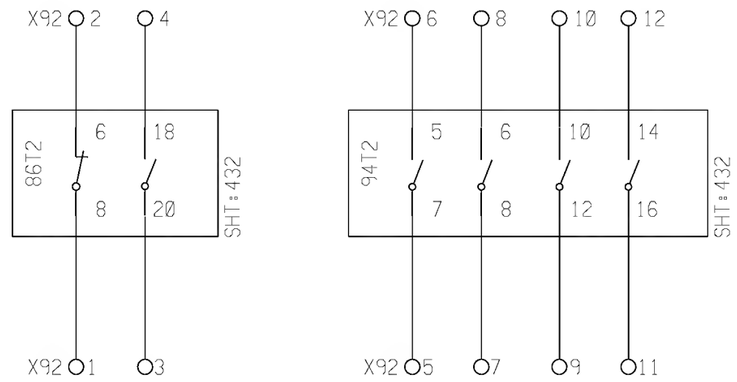
87T-2	R2 DC SUPPLY	R3 DC SUPPLY	TC-2	86T2	94T2	BUCHZ CONSERVATOR	SPARE
FAULTY	FAIL	FAIL	FAIL	OPTD	OPTD	ALARM	





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REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

AS-BUILT BY _____ DATE _____ CONTRACT NO. 11131113/00 JOB ORDER NO. S-13656

DRAWN BY RIZ CHECKED BY JKR

DATE STARTED 24.01.2013 DATE COMPLETED _____

OPRG. DEPT. CTPC ENG. DEPT. AUT-PSAC

STN COMMON ALARM CIRCUIT

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

الشركة الوطنية لنقل الكهرباء

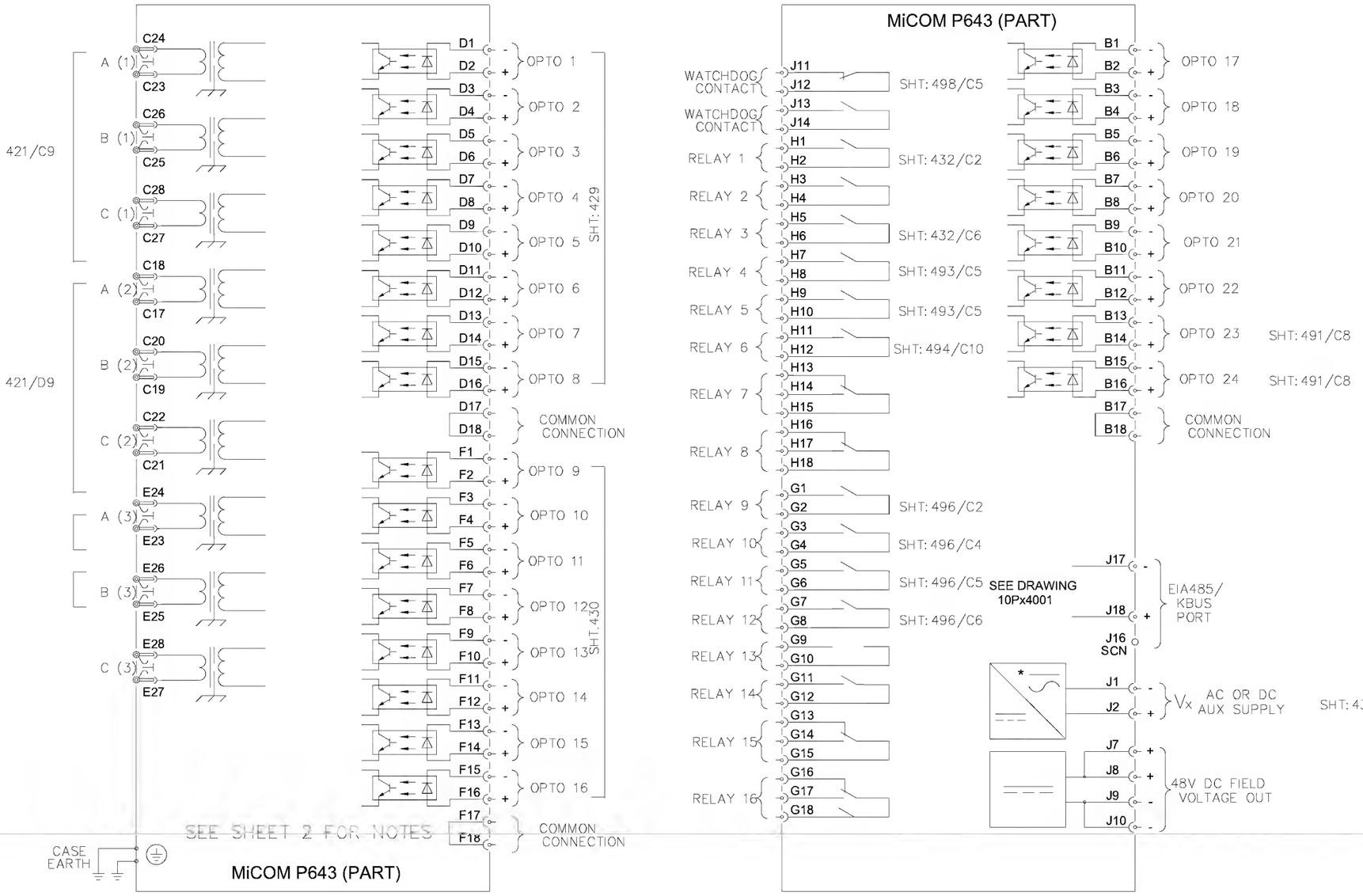
نقل الكهرباء National Grid SA

INDEX	PLANT NO.	DRAWING NUMBER	SHEET NO. SHT	SHEET NO. CONT.	REV. NO.
-	C421	CD-322931	499	501	01

NG/D2-D (2012/01)

DMS VECTOR NGD200

87T–2



AS-BUILT BY ____ DATE ____	CONTRACT NO. 11131113/00	JOB ORDER NO. S-13656	BLOCK REFERENCE
	DRAWN BY RIZ	CHECKED BY JKR	132/13.8kV GT-2 RELAY PANEL-2 +R01.2
	DATE STARTED 24.01.2013	DATE COMPLETED ____	S/S 8709-132/13.8KV IN AL-KHARJ CITY
	OPRG. DEPT. CTPD	ENG. DEPT. AUT-PSAC	RIYADH SAUDI ARABIA

REV. NO.	DATE	DESCRIPTION
01	13 49	FACTORY ASBUILT
00	13 04	FOR APPROVAL

الشركة الوطنية لنقل الكهرباء
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DMS VECTOR NGD200

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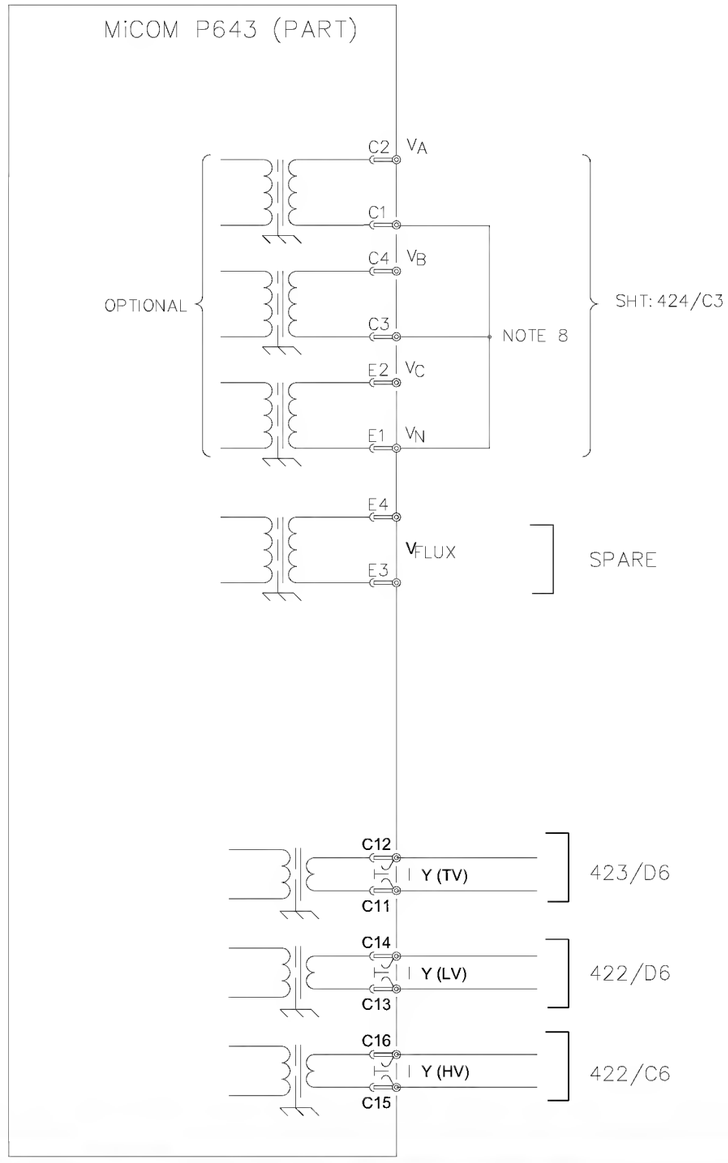

P643 BIAS INPUTS	BIAS 1	BIAS 2	BIAS 3
HV + LV	HV		LV
HV + LV (x2)	HV	LV	LV
HV (x2) + LV	HV	HV	LV
HV + TV + LV	HV	TV	LV

TABLE 1 (NOTES 5 & 6)

NOTE

1. (a) C.T. SHORTING LINKS MAKE BEFORE (b) DISCONNECT.
   (b) TERMINAL.
   (c) PIN TERMINAL (P.C.B. TYPE)
2. SEE TABLE 1 FOR BIAS ASSIGNMENT TO ACTUAL WINDINGS. BIAS INPUT 1 IS ALWAYS AN HV WINDING CONNECTION.
3. WYE GROUND INPUTS APPLICABLE FOR GROUNDED (EARTHED) WINDINGS.
4. THE VT MAY BE CONNECTED ACROSS ANY PHASE–PHASE PAIR. (USED BY V/Hz W2 PROTECTION ONLY).
5. (x2) DENOTES WINDINGS ENERGISED VIA TWO CT SETS. THE RELAY SOFTWARE SUMMATES A VIRTUAL WINDING CURRENT FROM THE TWO BIAS INPUTS.
6. TV INPUTS ARE NOT MANDATORY IF THE TERTIARY HAS NO LOAD.
7. FOR COMMS OPTIONS SEE DRAWING 10Px4001.
8. THE VT STAR POINT MUST BE MADE EXTERNALLY AS SHOWN.
9. THE MONITORED THREE PHASE VOLTAGE MAY BE CONNECTED HV, TV OR LV SIDE. (USED BY V/Hz W1 PROTECTION AND OTHER VOLTAGE PROTECTION).
10. DERIVED NEUTRAL POINT. SEE P64X/EN T/– – FOR DETAILS OF RESISTORS.

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AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

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DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

BLOCK REFERENCE

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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NG/D2-D (2012/01)

DMS VECTOR NGD200

REFERENCE	X3 AC CKT.	
411/A3	1	1
411/A7	2	2
411/A3	3	3
411/A7	4	4
411/B3	5	5
411/B7	6	6
411/B3	7	7
411/B7	8	8
SPARE	9	9
SPARE	10	10

REFERENCE	XTJ T.JACK	
411/C3	1	1
411/D3	2	2
411/D3	3	3
411/D3	4	4
SPARE	5	5

REFERENCE	XSH SPACE HEATER	
411/E6	1	1
411/F6	2	2
SPARE	3	3

REFERENCE	X6 ALM. CKT.	
412/B5	1	1
412/B5	2	2
499/E1	3	3

REFERENCE	X2 VT CKT.	
424/B4	1	1
424/B4	2	2
424/C4	3	3
424/C4	4	4
SPARE	5	5

REFERENCE	X1 CT CKTS.	
421/B5	1	1
421/B5	2	2
421/B5	3	3
421/B5	4	4
421/B5	5	5
421/B5	6	6
421/C5	7	7
421/C5	8	8
421/C5	9	9
SPARE	10	10
421/E5	11	11
421/E5	12	12
421/E5	13	13
421/E5	14	14
421/E5	15	15
421/F5	16	16
421/F5	17	17
421/F5	18	18
421/F5	19	19
SPARE	20	20
422/D4	21	21
422/D4	22	22
422/D4	23	23
422/D4	24	24
422/D4	25	25
422/E4	26	26
422/E4	27	27
422/E4	28	28
422/E4	29	29
SPARE	30	30
423/E5	31	31
423/E5	32	32
423/D5	33	33
423/D5	34	34
423/D5	35	35
SPARE	36	36
SPARE	37	37
SPARE	38	38
SPARE	39	39
SPARE	40	40

REFERENCE	X52 CON & PROTN CKTS.	
416/B3	1	1
416/B3	2	2
429/D3	3	3
432/D4	4	4
432/D5	5	5
SPARE	6	6
SPARE	7	7
SPARE	8	8
436/D3	9	9
436/D3	10	10
433/D1	11	11
433/D2	12	12
433/D4	13	13
433/D5	14	14
433/D6	15	15
433/D7	16	16
434/D1	17	17
434/D2	18	18
434/D4	19	19
434/D5	20	20
434/D6	21	21
434/D7	22	22
435/D1	23	23
435/D2	24	24
435/D4	25	25
435/D5	26	26
435/D6	27	27
435/D7	28	28
436/D2	29	29
436/D2	30	30
491/A4	31	31
491/C4	32	32
491/D4	33	33
491/E4	34	34
491/B5	35	35
491/A6	36	36
491/C5	37	37
491/C6	38	38
SPARE	39	39
SPARE	40	40
491/A9	41	41
491/B9	42	42
492/E2	43	33
492/E2	44	44
492/E3	45	45
492/E4	46	46
492/E4	47	47
492/E5	48	48
492/E5	49	49
492/E6	50	50

REFERENCE	X52 CON & PROTN CKTS.	
492/E7	51	51
492/E8	52	52
492/E9	53	53
492/E10	54	54
SPARE	55	55
SPARE	56	556
493/E5	57	57
493/E5	58	58
493/E7	59	59
493/E7	60	60
494/E3	61	61
494/E4	62	62
494/E4	63	63
494/E5	64	64
494/E5	65	65
494/E6	66	66
494/E5	67	67
494/E7	68	68
494/E7	69	69
494/E7	70	70
494/E8	71	71
494/E9	72	72
494/E10	73	73
494/E9	74	74
495/B2	75	75
495/E2	76	76
495/B4	77	77
495/E4	78	78
495/B5	79	79
495/E5	80	80
495/B7	81	81
495/E7	82	88
SPARE	83	83
SPARE	84	84
SPARE	85	85
SPARE	86	86
SPARE	87	87
SPARE	88	88
SPARE	89	89
SPARE	90	90

REFERENCE	X42 DC CKTS.	
416/B3	1	1
416/B3	2	2
416/C3	3	3
416/C3	4	4
416/D3	5	5
416/D3	6	6
429/B3	7	7
SPARE	8	8
SPARE	9	9
SPARE	10	10
432/A4	11	11
432/A5	12	12
433/B2	13	13
436/B2	14	14
432/A1	15	15
SPARE	16	16
SPARE	17	17
437/B4	18	18
437/B4	19	19
SPARE	20	20

REFERENCE	X53 CON & PROTN CKTS.	
498/E1	1	1
498/E1	2	2
498/E2	3	3
498/E2	4	4
498/E2	5	5
498/E3	6	6
498/E3	7	7
498/E4	8	8
498/E4	9	9
498/E4	10	10
498/E5	11	11
498/E5	12	12
498/E6	13	13
498/E6	14	14
498/E6	15	15
498/E7	16	16
498/E7	17	17
498/E8	18	18
498/E8	19	19
498/E8	20	20
498/E8	21	21
498/E9	22	22
498/E10	23	23
498/E10	24	24
SPARE	25	25
SPARE	26	26
SPARE	27	27
SPARE	28	28
SPARE	29	29
SPARE	30	30
SPARE	31	31
SPARE	32	32
SPARE	33	33
SPARE	34	34
SPARE	35	35
SPARE	36	36
SPARE	37	37
SPARE	38	38
SPARE	39	39
SPARE	40	40

AS-BUILT BY _____ DATE _____ | CONTRACT NO. 11131113/00 | JOB ORDER NO. S-13656

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DRAWN BY RIZ CHECKED BY JKR
DATE STARTED 24.01.2013 DATE COMPLETED _____
OPRG. DEPT. CTPD ENG. DEPT. AUT-PSAC

TERMINAL BLOCK REFERENCE

132/13.8kV GT-2 RELAY PANEL-2 +R01.2

S/S 8709-132/13.8KV IN AL-KHARJ CITY

RIYADH SAUDI ARABIA

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DMS VECTOR NGD200

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REFERENCE	X62 ALARM CKT	
414/B3	1	1
414/B4	2	2
498/E1	3	3
498/E2	4	4
498/E2	5	5
498/E3	6	6
498/E3	7	7
498/E4	8	8
498/E4	9	9
SPARE	10	10
SPARE	11	11
SPARE	12	12
SPARE	13	13
SPARE	14	14
SPARE	15	15
SPARE	16	16
SPARE	17	17
SPARE	18	18
SPARE	19	19
SPARE	20	20

REFERENCE	X92 SPARE	
499/C6	1	1
499/B6	2	2
499/C7	3	3
499/B7	4	4
499/C8	5	5
499/B8	6	6
499/C8	7	7
499/B8	8	8
499/C8	9	9
499/B8	10	10
499/C9	11	11
499/B9	12	12
SPARE	13	13
SPARE	14	14
SPARE	15	15
SPARE	16	16
SPARE	17	17
SPARE	18	18
SPARE	19	19
SPARE	20	20
SPARE	21	21
SPARE	22	22
SPARE	23	23
SPARE	24	24
SPARE	25	20

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